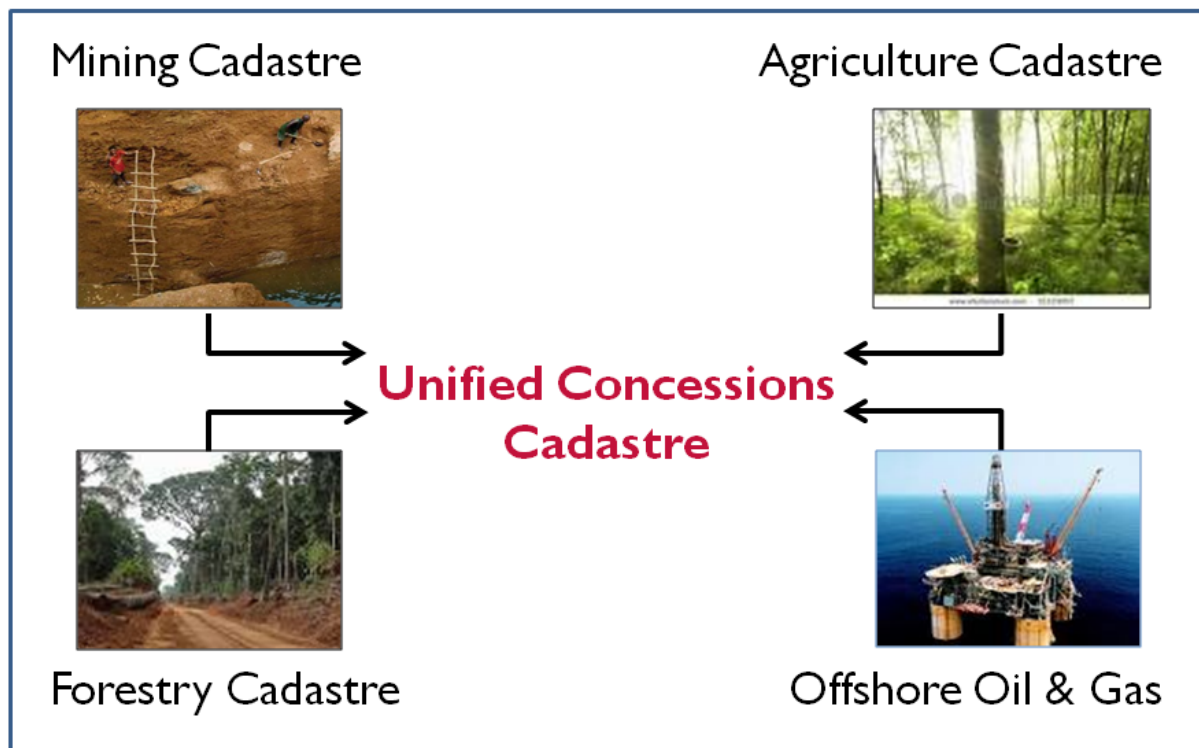




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A “ROADMAP” TO DEVELOP THE NATIONAL CONCESSIONS CADASTRE FOR LIBERIA (DRAFT)



February 2013

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Cover pictures from USAID-Mining Cadastre Information Management System (MCIMS) Final Implementation Report

**A “ROADMAP” TO DEVELOP
THE NATIONAL
CONCESSIONS CADASTRE
FOR LIBERIA (FINAL)
MAY 2013**

DISCLAIMER

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ACRONYMS

APLSL	Association of Professional Land Surveyors of Liberia
BAA	Business Area Analysis
CASUAL	Cadastral Surveyors Association of Liberia
CNDRA	Land Deeds Registry in Liberia
CORS	Continuously Operating Reference System
CTF	Concessions Task Force
CU	Cadastral Unit
DLSC	Department of Lands, Surveys and Cartography
DMS	Document Management System
FDA	Forestry Development Authority
GIS	Geographical Information System
GoL	Government of Liberia
GPS	Global Positioning System
IBI	IBI International
ICT	Information and Communications Technology
IMCC	Inter-Ministerial Concessions Committee
LA	Land Administration
LAS	Land Administration System
LiDAR	Light Detection and Ranging
LISGIS	Liberia Institute for Statistics and Geo-Information Services
LPIS	Liberia Land Policy and Institutional Support
LRC	Land Reform Commission
MAFFS	Ministry of Agriculture, Forestry and Food Security, Department of Forestry
MCIMS	Mining Cadastre Information Management System
MLME	Ministry of Lands, Mines and Energy
MoA	Ministry of Agriculture
NBC	National Bureau of Concessions
NCC	National Concessions Cadastre
NIC	National Investment Commission
NOCAL	National Oil Company of Liberia
PLSL	Professional Land Surveyor of Liberia
PPCC	Public Procurement and Concessions Commission
PSC	Production Sharing Contract
PUP	Private Use Permits
RDF	Revenue Development Foundation
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

This report addresses the need for and the issues surrounding the development and implementation of a National Concessions Cadastre (NCC) for Liberia. The NCC is a specialized automated property rights registry for overseeing the granting and managing of exploration and exploitation licenses for Liberian natural resources. The term “property rights” is meant to include minerals, including hydrocarbons, found both on-shore and offshore, together with the associated rights to use surface lands for access to and transport of the extracted minerals. Also included are rights to forestry and other agricultural resources. The cadastre would enable the Government of Liberia (GoL) to harmonize concessions for mining, agriculture, forestry, and oil and gas by providing consolidated access to information about ownership, agreement terms, timing, location, dimensions and value of individual concession areas. This consultancy was commissioned to design a “roadmap” to describe the steps to implement the NCC. The metaphor of a “roadmap” is used in the sense that the NCC would be a pathway by which the Government of Liberia could reach a destination of national economic and social growth through better management of the country’s natural resources. Development of the NCC should be relatively straightforward. However, the installation of the NCC in and of itself is not the end of the journey. The use, maintenance and integration of the NCC with other land management systems will be the key to its success.

The NCC will be a crucial tool for the management of the country’s natural resources and the concessions granted to exploit them. These natural resources can be the basis for acceleration of national economic and social growth. Accordingly, large-scale investments by agriculture, forestry, oil, gas and mining industries are necessary to achieve these benefits. Although the GoL recognizes the pressing need to develop Liberia’s natural resources, it also understands the existing processes by which concessions are granted must include greater participation by stakeholders. These processes must also be harmonized and made more efficient and transparent. Thus, implementation of the NCC is only one aspect of needed improvement in Liberia’s concession granting and management processes.

That better management of the Liberian concessions-granting process is needed is demonstrated by the eagerness of several key GoL Ministries to grant concessions. This haste to grant concessions has resulted in what may be described as a “land rush” by developers to obtain the rights to exploit mining, agricultural and forestry resources. Moreover, individual GoL authorities have a long history of granting concessions independently of each other and with little or no regard for competing land use activities. As a result, the GoL’s current processes to grant concessions are piecemeal, disconnected and uncoordinated. This disjointed approach has resulted in confusion over property rights among the Ministry of Lands, Mines and Energy (MLME), the Forestry Development Authority (FDA) and the Ministry of Agriculture (MoA). In addition, unclear concession boundaries lead to disputes among various GoL agencies, the concessionaires, investors and developers, and especially among the people who customarily derive their livelihoods from the lands on which the concessions are located. In addition, the GoL has not always asserted a strong position in its negotiations for mineral concessions, thereby losing both financial and social compensation for its resources.

Concurrently with the development of the NCC, the underlying deficiencies in land administration throughout the country should be addressed. The underlying deficiencies in Liberia’s land administration have been identified by both the GoL and donor programs. These deficiencies include, but are not limited to, the following:

- archaic, outdated, missing, conflicting or irrelevant land laws, land policies and regulations;
- lack of coordination among key sector agencies of the GoL, thus preventing a holistic approach to land administration reform;
- a deeds registry/land title system that is only now being rebuilt;
- human capacity shortages in technical areas such as surveying, mapping, geodesy, photogrammetry, land registration, land administration, land adjudication, GPS, GIS, and ICT;
- shortage of experienced trainers and faculty in academic institutions;
- an absence of licensing standards for professionals such as surveyors;
- lack of suitable infrastructure to support the implementation of required technologies (e.g., electricity, generators, vehicles for constructive field use as opposed to vehicles used for personal transportation of agency officials); and
- the inability of the GoL to sustain required technologies over the long term (e.g., software maintenance, on-going technical training, equipment repair).

A GIS-based cadastral system to support mining concessions has already been implemented in Liberia, so this idea is not new or radical. In 2009, USAID funded the implementation of a Mining Cadastre Information Management System (MCIMS) within the MLME. The system is focused on managing and tracking concession grants and continues to function, although the MLME has not allocated the budget to maintain the MCIMS. Consequently, even with the lack of maintenance of the MCIMS, its resiliency is a good indicator of the system's robust technical design and its well-executed implementation. Accordingly, this GIS-based MCIMS appears to be well-suited for use as the foundation for the NCC serving all GoL concession-granting authorities. Expanding the existing MCIMS into one that also supports and/or tracks other types of concessions is therefore recommended. A document management system should also be integrated into the national cadastral system. The NCC should also be web-enabled for the sharing of data across the departmental borders of the GoL concession entities and stakeholders, including organizations external to the GoL (e.g., the public, communities and investors).

A list of tasks needed to develop and implement the NCC is presented in this "roadmap." These tasks have been split into two categories: institutional tasks and technical tasks. Institutional tasks are regarded as "soft" activities, such as capacity building, law reform and organizational structures that need to be established to support the NCC. Technical tasks are those that are related to the technological activities necessary to implement a GIS-based NCC. Both task categories should be pursued concurrently. The proposed technology solution cannot be successful without full attention to the identified institutional tasks.

This report recommends the creation of a Presidential Concessions Task Force (CTF) to respond to the lack of institution-building and systems capacity within the GoL. In addition, it is proposed that the role of the Director General of the National Bureau of Concessions be elevated to a cabinet-level position. These recommendations address the many and complex impediments to effective concession management in Liberia. Special efforts to overcome them, including initiatives sponsored by the GoL's top leadership, are required.

The following is a summary of the most salient recommendations in this NCC Roadmap. The main body of this report explores these and other recommendations in greater detail.

Institutional Recommendations

- The GoL is urged to implement an integrated NCC in the National Bureau of Concessions (NBC). The NCC will allow NBC personnel to coordinate, administer and monitor concessions data and manage the legal and financial obligations tied to each concession. Other concession-granting agencies will be connected to and use the system to manage their individual concessions.
- The NBC should be regarded as the single voice that represents the overall best interests of the GoL with respect to concessions and concession management. As such, it is strongly recommended that the GoL recognize the NBC as the lead agency to oversee and coordinate the monitoring, evaluation and compliance of all concession contracts, including those for mining, oil and gas, agriculture and forestry. Although hydrocarbon concessions are the responsibility of NOCAL, NOCAL's relationship with the NBC should be no different than the other concession-granting authorities. This advice is not intended to diminish the mandate or authority of the respective granting authorities – this is simply designed to ensure coordinated concession governance.
- The GoL is advised to create a multi-sector Presidential Concessions Task Force (CTF) in response to the pressing needs for building capacity in Liberia's key institutions, and to mandate and coordinate actions to resolve the problems that now hamper the natural resources sectors. This body should not only articulate the various issues related to concessions but also work to enact needed solutions. The primary function of the CTF will be to ensure the NCC Roadmap described in this document, and specifically the various technical and institutional tasks outlined herein, are entirely accomplished.
- For each natural resources sector, there are different laws and regulations that define the governance and regulatory framework for concession agreements and foreign investments. These need to be reviewed and harmonized to provide a more coherent regulatory and policy framework and a more systematic concession process, especially in the areas of incentives, taxation and royalties. In addition, an overall national policy on concessions should be adopted.

Technical/System Recommendations

- The NCC should be founded on GIS technology, be web-enabled and be integrated with a digital document management system. For GIS applications such as the proposed NCC, the world standard is based on Esri technology (Tennant 2011). The GoL is strongly advised to adopt this Esri technological standard to facilitate exchange of spatial data among the various GIS-based systems now existing or under development within the GoL.
- The GoL should expand the existing MCIMS now in operation within the MLME. The existing MCIMS is already founded on Esri technology and will therefore serve as a suitable model to support and track the types of concessions administered by all of the GoL granting authorities. Its successful implementation in 2009 in the MLME suggests that a further rollout of the technology into the additional GoL agencies is not only possible, but is likely to succeed.
- A Business Area Analysis (BAA) is recommended as the first step toward the development of an NCC. The BAA will analyze each granting authority's procedures for approving a concession application. The BAA will identify the personnel involved in the concession approval process as well as the business processes or workflows they perform for each transaction. The BAA will also identify the required data that must be collected and processed for each transaction, including the requirements for a digital document management system, discussed later in this report. The information collected by the BAA will, in turn, be used by the system developers to design and build the NCC.

- To ensure the long-term sustainability of the NCC, it is strongly recommended that the NBC retain overall budgetary control of the operation and maintenance of the NCC for all participating agencies. This arrangement will make it easier to guarantee that the necessary funds are properly and timely allocated to each agency. The NBC will serve as the central distribution point for the NCC maintenance budget for each of the granting authorities.

The estimated total cost to bring the NCC into a sustainable condition is 23.3 million USD. Of this, 7.3 million USD are required for design and implementation, with the balance of 16 million USD needed for essential supporting tasks. Annual recurring maintenance costs are estimated at USD \$130,000 (exclusive of salaries).

INTRODUCTION AND JUSTIFICATION FOR THE NCC

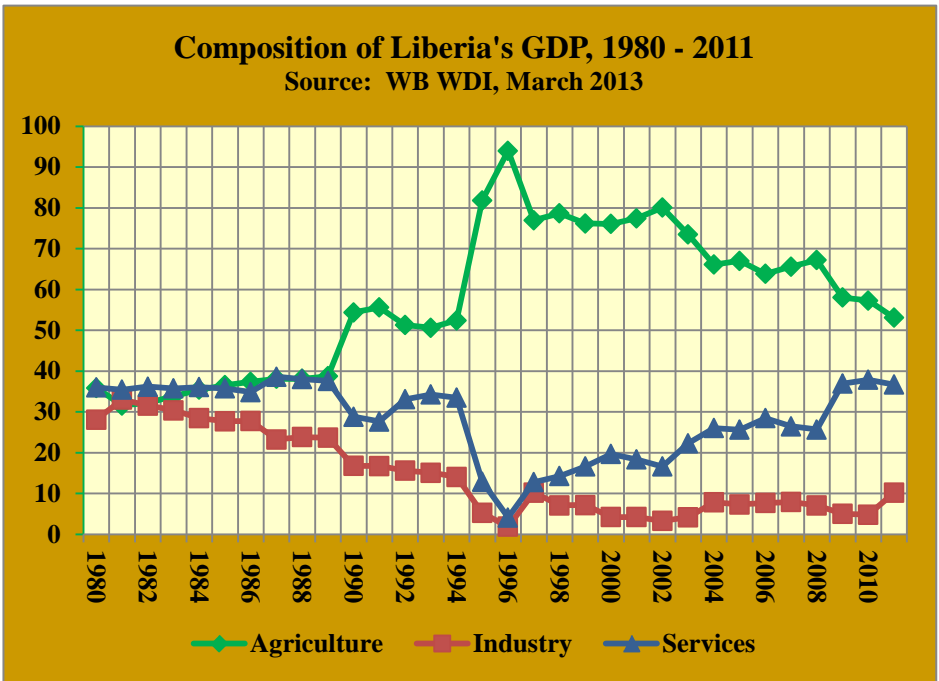
Liberia is a nation endowed with vast natural resources. Currently, these natural resources are the foundation of the country's economy. The natural resources are held by and in the name of the GoL for the benefit of all Liberians. For over 80 years, Liberia's economy has depended heavily on foreign investment by awarding concessions to international corporations that focus on the natural resources industries, namely mining, agriculture (rubber and oil palm plantations) and forestry (timber). Despite this rich foundation and a long history of foreign investment, the country remains one of the poorest in the world. The World Bank's World Development Indicators for 2013 has 2011 GDP per capita data for 179 economies. In that list, Liberia ranks 167th, with a per capita GDP of only 279 dollars (constant 2000 USD).¹

What is a concession?
 A concession is defined as "a grant of land or property especially by a government in return for services or for a particular use."
<http://www.merriam-webster.com/dictionary/concession>

Concessions in Liberia are granted for mining, forestry and agricultural purposes.

Concessions have not generated the revenues and benefits required for sustainable social and economic growth. This can be seen by tracking the composition of Liberia's economy since 1980.² As can be seen, over half of Liberia's economy is derived from agriculture. Industry, which includes mining, has only reached ten percent or more in two years since 1995, and represented a decreasing

share of the economy in most years since 1980. Recent concession agreements in the mining sector hold the promise of increased government revenues and a higher GDP, and may create downstream linkages that will generate



¹ World Bank World Development Indicators, 2013. Calculations by the author.

² In absolute terms, all three sectors have shown gains over the period 2000 – 2011, the period for which comparable data are available. In constant 2000 US dollars, agricultural output increased by 267,000,000 USD (66%); industrial output (including mining) increased by 60,000,000 USD (266%); and services increased by 297,000,000 USD (285%). The chart shows the relative decline of the agricultural sector in relation to the growth of the services sector, and the relative lack of growth in the industrial sector. While the Liberian economy overall grew by 624,000,000 USD in the same period, an increase of 118%, the natural resources sectors have become relatively smaller. The goal of better concessions management is to increase the share of natural resource value-added in the economy relative to the other sectors. Source: World Bank World Development Indicators 2013, calculations by the author.

further economic opportunities for Liberia’s growing work force. Even so, there is mounting pressure on the government to increase revenues and more equitably distribute Liberia’s potential wealth. The country cannot afford further delay in economic development arising from its natural resources.

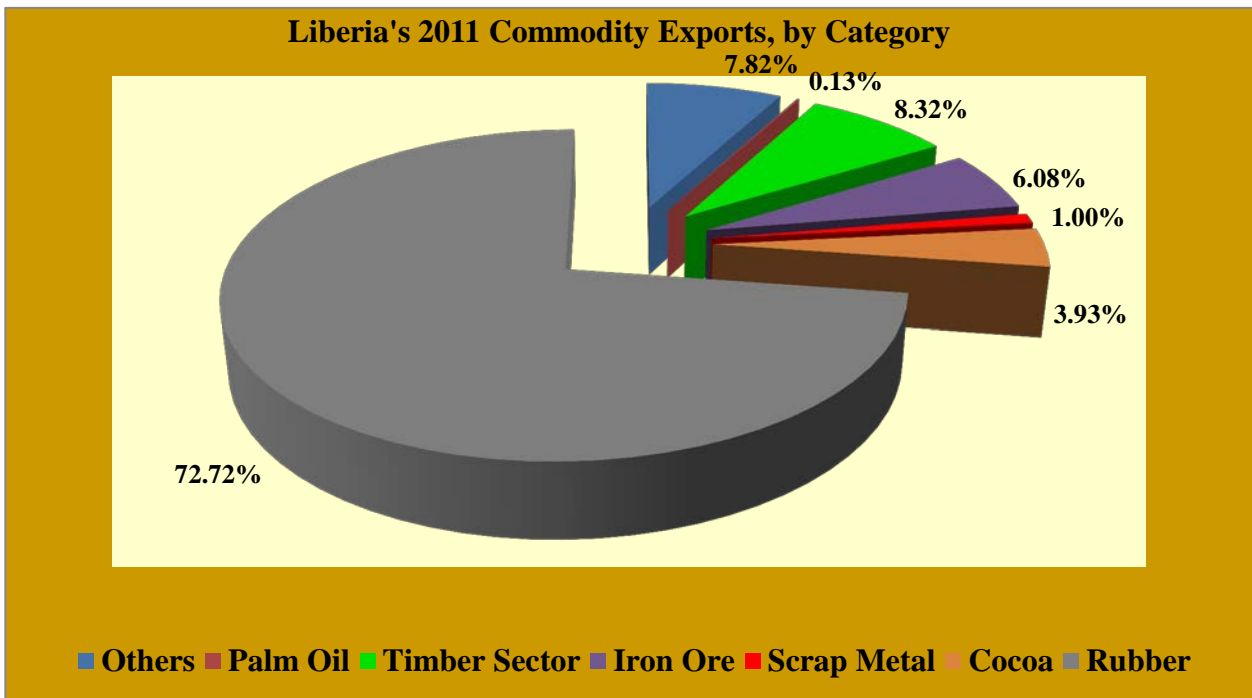
Liberia has been unable to capitalize on its natural resources for a number of reasons, not the least of which is many years of internal conflict and political instability. The conflict and turmoil led to the loss of resources and revenues that could have been used to build both the people and the economy. These unfortunate events also diminished Liberia’s institutional and human resources. Liberia also lacks the systems needed to support the wise use of its natural resources. Consequently, the country’s development has been impeded.

Liberia’s Reliance on Concessions at a Glance:

- 1) In 2011, export earnings from the agricultural sector alone amounted to \$280 million, 95% of which were derived from rubber concessions (see chart on this page).
- 2) More than half of Liberia’s projected 8.9% GDP growth rate for 2012 is expected to be driven by the mining sector.
- 3) In FY12/13, the MOF projects that concessions revenues will amount to approximately \$1.6 million in exploration and license fees, more than \$13 million in social development funds, and over \$33 million in rent.
- 4) Liberia has the highest foreign direct investment to GDP ratio in the world (84.9%)

Sources: 1, 2 from Ministry of Finance, Republic of Liberia, Annual Economic Review, December 2012 at pages 6 and i. 3 from Ministry of Finance, Republic of Liberia, Revenue Forecast, 30 May 2012. 4 from World Bank World Development Indicators, accessed 19 April 2013.

Liberia has an urgent need to expedite national economic and social growth by generating revenues from its rich foundation of natural resources. This is a compelling reason for the GoL to



Source: Ministry of Commerce, as cited in Ministry of Finance, Republic of Liberia. Annual Economic Review. December 2012.

undertake major reforms in the way concessions are awarded, administered and monitored. This document is intended to serve as a “roadmap” to guide Liberia’s stakeholders in effecting changes to the way that natural resources concessions are administered. This roadmap recommends a comprehensive approach to solving some of the more persistent problems in managing concessions.

The recommended approach has two components. The first component requires reforms to the current processes to award concessions, as well as to the policies, laws and regulations that underpin these existing processes. Major efforts to build human and institutional capacities are necessary elements of this component. The second component requires the use of modern technologies to provide the government with solid data for decision-making. Technologies must be introduced incrementally and should be accompanied by capacity-building programs that create the know-how required to manage and utilize these technologies. These two components are the framework for improving the concessions processes in Liberia and are explored in detail in this document.

THE KEY STAKEHOLDERS IN THE CONCESSIONS PROCESS

“Stakeholders” is a term used throughout this report and refers to those agencies or institutions directly affected by or having an interest in the concessions process. There are three essential categories of stakeholders: 1) GoL agencies that are either directly or peripherally involved in the concession award and management processes; 2) concession holders from the private sector; and 3) customary communities whose lands may be taken for concessions. These three groups of stakeholders are described in this section in more detail. These stakeholders should be intimately involved in any reforms undertaken to improve concession governance. Regardless of their individual roles in the concessions management process, each of these entities requires accurate information on the location of concessions.

The Liberian People — First and foremost are the people of Liberia whose economic, social and personal security depends on the wise and effective use of the country’s natural resources.

Granting Authorities — The core GoL entities³ responsible for granting concessions in Liberia are: 1) the Ministry of Lands, Mines, and Energy (MLME); 2) the Forestry Development Authority (FDA); 3) the Ministry of Agriculture (MoA); and 4) the National Oil Company of Liberia (NOCAL). These four institutions are the GoL entities that award concessions. The first three entities are responsible for onshore, land-based concessions, whereas NOCAL is responsible for oil and gas production sharing contracts (PSC) pertaining to offshore lands. A PSC is a variant of a concession agreement.

The Ministry of Lands, Mines and Energy (MLME) — issues various types of exploration and exploitation licenses, including Mineral Development Agreements, Mineral Exploration Agreements, Reconnaissance Licenses, Prospecting Licenses and three types of mining licenses. This agency requires technical data for evaluating applications and proposals, as well as data for tracking actual production and compliance. Several of the licenses cover vast areas of the country but many of the licenses, for activities such as artisanal mining, apply to very small geographical areas and have relatively short terms. The MLME has a fundamental need for location-based data when analyzing concession applications. Concession applicants typically submit the latitude/longitude positions of the proposed concession areas to the MLME, but the accuracy of the coordinates may or may not be sufficient to locate the points on the ground, and accurate boundary descriptions are needed to avoid conflicts between concession holders and local communities.

The Forestry Development Authority (FDA) — also has a need for location-based data to track/monitor forest management and concession activities. The FDA is responsible for community, commercial and conservation forest management. The FDA also participates in international conservation programs such as the United Nations’ Non-legally Binding Instrument on All Types of Forests (NLBI) forest sustainability program and the UN Food and Agriculture Organization (FAO) National Forest Program for sustainable forest management. Liberia also is a participant in the EU’s Forest Law Enforcement, Governance and Trade (FLEGT) program to verify the legality of timber exports to the European Union (EU). The FDA issues various types of licenses and permits for timber sales, private use permits, community forest management, forest products utilization agreements, salvage permits and others. The FDA is responsible for ensuring license or permit holders comply with the terms of their agreements. Concession applicants typically submit the latitude/longitude positions of the proposed concession areas to

³ Other types of concessions are important to Liberia, such as transportation, construction, ports, railways, roads, water, electricity, and communications. However, this document focuses on concessions for natural resources (extractive industries), agriculture and forestry.

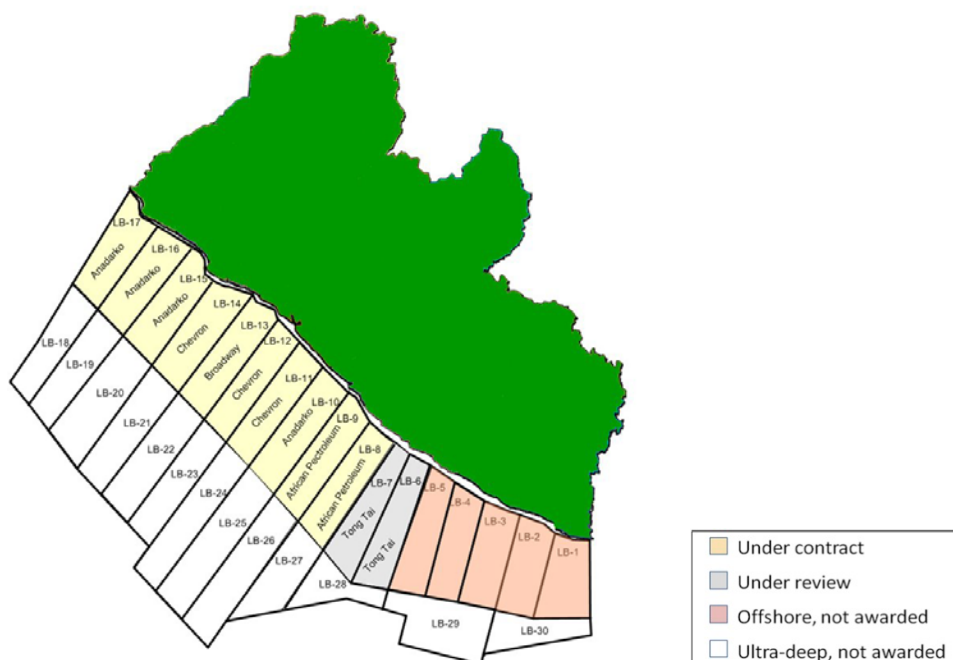
the FDA, but the accuracy of the coordinates may or may not be sufficient to locate the points on the ground.

The Ministry of Agriculture (MoA) — has concluded several concession agreements with commercial investors to develop targeted sub-sectors within the agriculture and forestry sectors. In the agriculture sector, investor focus is now changing from rubber to other sub-sectors such as rice, palm oil, cocoa, coffee and bananas. Presently, private commercial sector investment represents over 800,000 hectares. The MoA processes applications and issues licenses for agricultural concessions. The Ministry also manages compliance with these agreements by concession holders. Concession applicants typically submit the latitude/longitude positions of the proposed concession areas to the MoA, but the accuracy of the coordinates may or may not be sufficient to locate the points on the ground, making accurate determination of boundary locations difficult, if not impossible.

The National Oil Company of Liberia (NOCAL) — is also involved in reviewing and granting concessions. Despite the absence of oil discoveries in commercial quantities within Liberia’s offshore territory, there is strong interest by global oil corporations to determine if offshore hydrocarbon reservoirs exist. To support offshore exploration, the GoL has demarcated a grid of 30 blocks for purposes of granting exploration and drilling rights. These rights are generally referred to as production sharing contracts (PSCs); these are equivalent to concessions in the sense that both are legal vehicles for conveying certain rights to natural resources. Under a PSC, the GoL, represented by NOCAL, remains the prime owner of the blocks. Under a PSC, a private company is only given the opportunity to invest in the exploration and extraction of any discovered hydrocarbons, and if there is a discovery in commercial quantities, the GoL will split the net revenues with the contractor. PSCs spell out the details of the agreement such as the sharing proportions or whether the GoL obtains cash or in-kind payments. The exploration licenses must be tracked and these agreements monitored. Offshore positioning techniques are generally of fair-to-good accuracy for seismic exploration ships as well as drilling rigs. The boundaries of the blocks cannot be demarcated at sea with beacons, so mathematical positions are determined by GPS.

Liberia’s Oil Blocks

Source: http://www.tlcafrica.com/liberia_oil_blocks_march_2012.htm Accessed 28 April 2013



The National Bureau of Concessions (NBC) — This is the independent body responsible for providing technical support to the aforementioned GoL concession-granting entities at all stages of the concession process. Among other tasks, the NBC is charged with verifying the compliance of concession contracts on behalf of each GoL entity, and on behalf of the GoL as a whole. The NBC therefore provides a critical service to each of these four entities, and thus the NBC will require a central role in the development and use of a national concessions management system. The NBC replaces the former Bureau of Concessions (BOC), which historically was responsible for monitoring and evaluation (M&E) of concession agreements.

“Thus, in furtherance of the national policy to promote good governance as a cornerstone for sustainable economic growth and development, the Government with the support of our development partners, propose to establish the National Bureau of Concessions (NBC) as an autonomous body to achieve the following objectives, among others:

- a. Creating central repository of knowledge and skills with respect to concessions;
- b. Strengthening the institutional capacity of the government to administer the concession process;
- c. Coordinating activities of, and assisting ministries and agencies having oversight responsibilities over the granting of concessions;
- d. Establishing guidelines and regulations for the granting of concessions;
- e. Preparing draft concession agreements;
- f. Formulating, promoting, supporting and implementing training and capacity development programs in furtherance of the concession process;
- g. Promoting transparency and accountability in the award of and performance under concession agreements and the application of concession revenue received by government;
- h. Assisting ministries and agencies of the government, through the Inter-Ministerial Technical Committee, in the preparation for and solicitation of bids for concession contracts;
- i. Carrying out the evaluation of bids for the award of concession contracts to successful bidders;
- j. Monitoring and evaluating operations under concession contracts and reporting on concessionaires’ compliance with the terms and provisions of concession agreements etc.

Coordination with ministries/agencies of government and other parties to the agreement.”

Liberian President Ellen Johnson Sirleaf, in submitting the National Bureau of Concessions bill to the President Pro-Tempore of the Senate, 5 August 2010.

Inter-Ministerial Concessions Committee (IMCC) — The IMCC is an *ad hoc* committee that convenes on a case-by-case basis to review, evaluate and negotiate concession proposals. In the past, the IMCC relied on the recommendations of a sub-committee (Inter-Ministerial Technical Committee) regarding the merits of each proposal; however, this function has now been assigned to the new NBC. The title of the IMCC is somewhat confusing because, in practice, only the granting authority that seeks the IMCC’s approval for a concession is typically involved in the discussion. The other granting authorities are usually not consulted and, as such, the decision-making process it is not an inter-Ministerial exercise in practice.

The National Investment Commission (NIC) — The NIC chairs the Inter-Ministerial Concessions Committee (IMCC), which includes permanent committee members from the Ministries of State, Finance, Justice, and Planning and Economic Affairs, as well as other key stakeholder ministries and agencies. The IMCC works to ensure that while unlocking Liberia’s natural resources, the country’s national interest is safeguarded, jobs are created, and access to capital, new technologies, markets, and world-class training and business development is accelerated. The IMCC also approves investment incentive contracts above USD \$10 million.

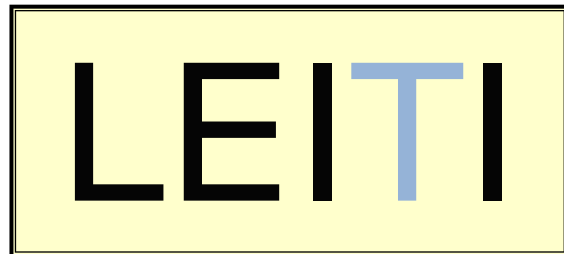
The Land Commission — This commission is an independent body with a mandate to propose, advocate and coordinate reforms of land policy, laws and programs in Liberia. It does not have an adjudicatory or implementation role. The Commission was established by an Act of the National Assembly in 2009 to promote:

- equitable and productive access to the nation's land, both public and private;
- security of tenure in land and the rule of law with respect to landholding and dealings in land;
- effective land administration and management; and
- investment in and development of the nation's land resources.

The Governance Commission (GC) — Created by an Act of the National Assembly in 2007, the GC is mandated to address the following areas: 1) political and legal reforms; 2) public sector reforms; 3) civic education, national identity and national visioning; 4) a National Integrity System; and 5) monitoring, evaluation, research and publication. This includes revisiting the ideals, mission and constitution of Liberia, and undertaking, among other things, land reforms, security sector reforms and judicial reforms.

The Liberian Extractive Industries Transparency Initiative (LEITI) — The Extractive Industries Transparency Initiative (EITI) is an international organization that offers a global standard to promote revenue transparency for the extractive industries. Countries elect to participate. As a member of EITI, Liberia is obligated to maintain compliance with EITI's methods and processes for revenue accounting. To implement its participation in EITI, in 2009 the GoL created LEITI. It comprises a broad coalition of stakeholders including, but not limited to, government officials, members of Parliament, members of extractive companies and civil society organizations that include an association or union of workers in the extractive sectors. The purpose of LEITI is to ensure that all financial and social benefits derived from the exploitation and/or extraction of the country's minerals and other resources are endowed to the Government and to the people of Liberia on the basis of equity and sustainability. LEITI is also mandated to monitor and report on the social development funds to which the concession holders contribute. LEITI is closely aligned with the GoL's Poverty Reduction Strategy (PRS) - expanding peace, security, and the rule of law; promoting economic transformation; and strengthening governance and public institutions.

Section 4.1 f. of the LEITI Act requires the LEITI to:



“....serve as one of the national depositories of all concessions, contracts, and licenses and similar agreements and rights granted by the Government of Liberia to individuals and companies in respect of the logging, mining, oil, forestry, agriculture and other designated sectors; and to grant members of the public access to such concessions and agreements in keeping with their status as public documents”.

Currently, LEITI is serving as *the* national repository of “all concessions, contracts, and licenses and similar agreements and rights granted by the Government of Liberia”

Public Procurement and Concessions Commission (PPCC) — To regulate all forms of public procurement and concessions, the GoL passed legislation in 2005 to create an agency named the

Public Procurement and Concessions Commission (PPCC). The objective of the Commission is to ensure the economic and efficient use of public funds in public procurement and to ensure that public procurement and concession processes are conducted in a fair, transparent and non-discriminatory manner.

Ministry of Finance (MoF) — The MoF administers the revenue program of the government, including the supervision of the collection of the revenues. The MoF is responsible for ensuring that all payments due the government are actually paid by the concessionaires.

Environment Protection Agency (EPA) — Created by an Act of the National Assembly in 2002, the EPA is a monitoring, coordinating and supervisory authority for the sustainable management of the environment. The EPA works in partnership with regulated ministries and organizations and in a close and responsive relationship with the people of Liberia. The EPA has a key role in monitoring concessions to ensure their compliance with environmental protection regulations. The Agency also promotes and supports traditional and indigenous technologies for the conservation and sustainable use of natural resources and complements them with appropriately developed modern technologies.

Concession Holders — Private sector natural resources industries develop Liberia’s natural resources and make possible financial benefits to themselves, the GoL and the people of Liberia. They include large international companies as well as small-claim holders such as artisanal miners.

Ministry of Internal Affairs (MIA) — The MIA works to implement the decentralization of government functions in Liberia, thereby empowering and/or distributing power to local government structures in the political subdivisions. Local governments throughout Liberia are the “front-line” bodies which experience the direct effects of conflicting land rights, especially in rural communities. The MIA is therefore a key player in mitigating problems that arise between the concession holders and community members adversely affected by land conflicts.

Local Communities — Last, but certainly not least, are the people who live in the rural communities in which the exploitation activities occur. The GoL recognizes the existence of conflicts and complaints within local communities stemming from unsatisfactory interactions between the communities, the government and the concession holders. These conflicts and complaints must be addressed if the people in the local communities are to believe the government will keep its promise to ensure Liberia’s natural resources benefit all Liberians.

CRITICAL ISSUES

The need for rapid development of Liberia's natural resources is well recognized; however, the eagerness by the GoL ministries to grant concessions has resulted in what can be described as a "land rush" by the extractive industries to grab mining, agricultural and forestry resources. The GoL's current processes to grant concessions are piecemeal, disjointed, and not coordinated across GoL agencies. In simple terms, the current situation has the following characteristics:

Lack of inter-agency coordination — Each GoL concession granting authority is responsible for evaluating concession applications and proposals, negotiating the terms of concession agreements to achieve the best value for Liberia, and ensuring that each concession holder complies with its obligations to the GoL over the lifespan of the agreement. These individual GoL entities have a long history of granting concessions independently of each other and without regard for competing land-use activities arising because of the lack of coordination in granting concessions. As a result, the GoL does not have access to integrated information about natural resources concessions. The government is thus unable to maximize the economic and social benefits that would otherwise accrue, and suffers from negative externalities such as conflicts between concessionaires.

Lack of a national land inventory — There are four basic categories of land ownership in Liberia: government land (including protected land), public land, customary land and private land. According to Marquardt (2012):

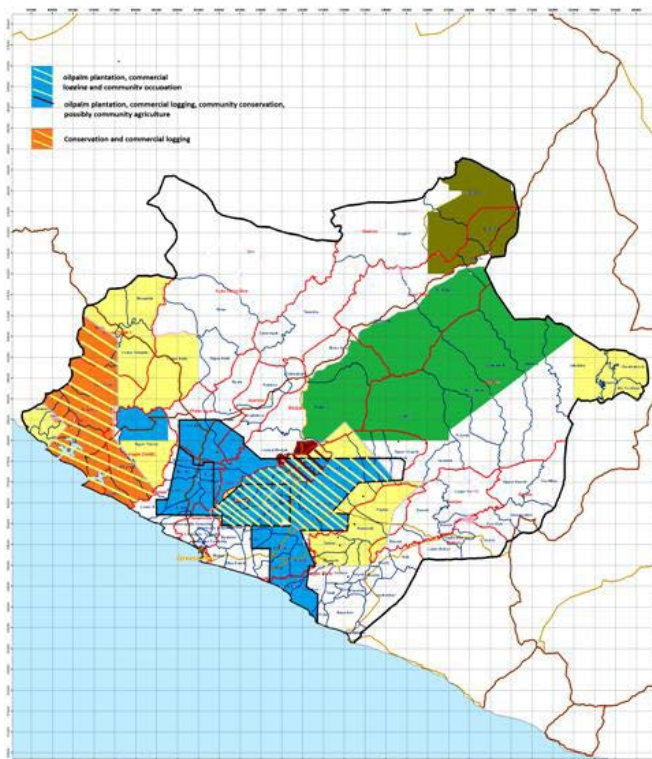
- Government land is defined as land used for the buildings, projects or activities of the Government.
- Customary lands are typically owned by indigenous communities and administered in accordance with their customs, as opposed to statutory tenure such as with deeded lands. Common ownership is one form of customary land ownership and time-honored methods usually exist for resolving disputes about rights to land. Customary land ownership, including the rights of use and management, is recognized in the Constitution of Liberia. Historically, customary land ownership rights either have not been recognized or have been given less judicial deference than private deeded land.
- Public land is defined as land that is not private, customary, or government land. Historically, all land under GoL control was treated as public land without any distinction based on how the land should be managed, used, and transferred.
- Private land does not have a clear definition in Liberia. Almost all Liberians regard private land as equal to deeded land and deeded land as equal to land held in fee simple.

The GoL has no clear understanding of the extent or location of the lands in each of these categories. This is reflected by the confusion in concessions governance. To obviate this problem, an inventory of lands in Liberia is necessary. Realistically, only the inventory of customary lands may be completed within a reasonable timeframe. Since most of Liberia's property records for private lands were destroyed during previous conflicts, inventory of private lands will take many years to accomplish. The USAID Land Policy and Institutional Support (LPIS) Project has started to re-build a deed registry system; however, the country is still years away from implementing such a national property cadastre. This major undertaking will require multi-million dollar funding. Therefore, the inventory of customary lands, which may be accomplished within a reasonable timeframe, should be undertaken as soon as funds are available. Doing so would help diminish future conflicts between concessionaires and local communities when concessions are granted.

Overlapping concession boundaries — A concession’s approximate physical location is usually known to the granting authority because applicants are required to provide boundary location data as part of the concession application. Often, however, the boundaries are not described precisely. Moreover, there is no efficient way for an entity to share concession boundary information with the other granting authorities, nor is there any mandatory institutional process to require the concession-granting agencies to share the boundary location data they do have. This has resulted in many overlapping claims. This is problematic for all of the granting entities, the holders of the overlapping concessions and even more so for the affected communities. Consequently, conflicting land rights, and conflicting uses of land, have been the source of disputes among the various GoL agencies, the concessionaires, investors and developers.

Lack of integrated policies for concession boundary conflict resolution — When overlapping concessions occur, there are currently no policies in place for the affected parties to determine the priority of actions to be taken to resolve the conflicts.

Exclusion of customary land holders in the concession-granting process — The concession area is normally awarded without knowledge of the local land tenure structure. In part, this is due to a lack of knowledge of the boundaries between public and customary land, and in part it is due to a lack of respect of customary rights. Holders of customary lands in proposed concession areas typically do not participate in the concession negotiations. This is a major source of conflict between the GoL, the inhabitants of lands held in customary tenure, and the concession holders.



No clear demarcation of public lands and protected areas — The GoL has treated all land not deeded as public land. However, there has never been a clear definition of either public lands or customary lands, nor of the relationship of public lands to pre-existing customary land rights. As such, the granting entities do not have a clear understanding of the boundaries between public lands and customary lands, and often grant concessions on customary land as if that land were public land. In addition, there is evidence to suggest concessions have been granted on protected land. In a recent report, the Land Commission uncovered a complex web of overlapping land use and property rights in Sinoe County.⁴ In some areas north of Greenville, for instance, land has been dedicated to several incompatible uses, including 1) community forestry, 2) commercial logging under a PUP, 3) oil palm production by Golden Veroleom, and 4) possible production by Equatorial Palm Oil.⁵ This is demonstrated in the map above, in which the orange

2) commercial logging under a PUP, 3) oil palm production by Golden Veroleom, and 4) possible production by Equatorial Palm Oil.⁵ This is demonstrated in the map above, in which the orange

⁴ De Wit, Paul. *Land Inventory and Land Management Planning in Sinoe County*. Land Commission of Liberia, prepared with support of EU Project FED/2011/270957. September 2012.

⁵ De Wit, Paul. *Ibid.*, at page 22.

and yellow-striped area indicates land that has been dedicated to both conservation and commercial logging. The blue and yellow-striped areas indicate land that has been designated for oil palm production, commercial logging and community conservation; while the red stripes indicate areas where community agricultural activities might also be taking place, in addition to the three aforementioned activities.

Lack of a national geodetic control network — A national geodetic control network is necessary to provide the reference framework for all surveys in Liberia, including surveys of mineral concessions.

Geodetic control surveys are measured to far more rigorous accuracy and quality assurance standards than those for local surveys for property boundaries, engineering, construction or topographic mapping purposes. Liberia does not now have such a network. There is currently no accurate means to measure the location of ground control points in Liberia. These control points are of critical importance to the topographical mapping program discussed below.

The donor community has begun to remedy this situation. The USAID LPIS Project is presently funding the installation and measurement of a high-order geodetic control monument for each of Liberia's counties. These

points will serve as geodetic reference points for "roving" GPS survey instruments used to collect field measurements for all types of surveys. The completion of the survey control network is expected to occur in the first half of 2013.

In addition, USAID is funding the installation of one Continuously Operating Reference Station (CORS) in the vicinity of Monrovia. A CORS is a special geodetic control station that will improve the precision of GPS-collected positions. Post-processed CORS coordinates approach a few centimeters of positional accuracy. The CORS will be very useful for positioning offshore drilling rigs as well as for on-shore field surveys. A CORS, however, requires ongoing maintenance which the GoL must provide so as to not lose the benefit of this technology. The system operates by continually producing a radio broadcasting signal, and its electronic equipment requires an energy source, which, in this case, will be solar-power panels and a back-up generator. The GoL must allocate a budget to operate and maintain the CORS.

A **geodetic control network** is the wire-frame or the skeleton on which continuous and consistent mapping, Geographic Information Systems (GIS), and surveys are based. To understand the function of geodetic control, we have to realize that a map or a plane survey is a flat representation of the curved world. If we want the maps to become an authentic representation of the real world, we have to be able to "paste" small pieces of (flat) map contents onto a curved world. The Geodetic Control is the mechanism that enables us to perform this "pasting" seamlessly, accurately and consistently.

Traditionally, geodetic control points are established as permanent physical monuments placed in the ground and precisely marked, located, and documented. Locating spatial features with respect to geodetic control enables the accuracy assessment of these features. Interest and activity regarding geodetic control has dramatically increased at all government levels because of the need for accurate maps and surveys used in geographic and land information systems.

With the advent of the Global Positioning System (GPS), the framework of the geodetic control network . . . should preferably be based on CORS (Continuously Operating Reference Stations). CORS stations provide an active geodetic control network, which enable GPS users to tie their positioning observations to the geodetic network without physically having to occupy a geodetic control point. Spatial data is geo-referenced to the geodetic network by processing roving GPS receiver data with data from CORS stations.

Bevacqua, S. and Salz, R., editors. 2003. *Hawai'i I-Plan for Spatial Data, Version 1.1*. Hawai'i Geographic Information Coordinating Council.

The use of handheld GPS devices is increasing in Liberia, but the benefit of these devices will be limited until the geodetic network is established. Handheld GPS positioning devices generally provide an accuracy level of +/- 10 meters. In rural areas this low-level accuracy may be tolerable, but in settled areas where cadastral surveying is needed and in other areas where boundary conflicts occur, higher accuracy levels are required. Other positioning techniques, such as Differential GPS (DGPS), can be used to great effect but require the use of two survey-grade GPS receivers in which one unit is placed on a ground control point of known accurate coordinates. The errors in measurements by the other GPS unit can thereby be corrected to enable higher accuracy levels. Again, use of this more sophisticated equipment, which would greatly assist the concessions granting and management processes, is impeded by the lack of an accurate geodetic control network.

Lack of digital national topographical map coverage — Topographic maps have many uses as basic tools for planning and executing projects. They are an essential part of geologic and hydrologic research, of mineral investigations and of studies on the quantity and quality of water. They greatly facilitate the study and application of flood control, soil conservation and reforestation. Topographic maps are also of prime importance in planning highways, dams, industrial plants and countless other types of construction. Intelligent and efficient development of natural resources depends on the availability of adequate topographic mapping.

A topographical mapping program in Liberia occurred in the 1960s, but the paper-based series is out of date and incomplete. Several sections of the country have never been mapped, including portions of Grand Gedeh, Sinoe, Nimba, Maryland, River Gee and Lofa Counties (Thriscutt 2013). There are other outdated, incomplete map series for Liberia that are not suitable for managing concessions. Consequently, the existing paper topographical map coverage is inadequate for most purposes. It is understood that the Liberia Institute for Statistics and Geo-Information Services (LISGIS) has scanned the paper maps to produce digital raster maps, but these lack the necessary accuracy for any purpose related to concessions management. The most effective topographic mapping for the country would be a large-scale (1:10,000) series with contours derived from an airborne LiDAR system. A rough cost estimate for such a national program is in excess of USD six million. In the short-term, less costly interim map coverage such as satellite imagery would still be useful for NCC purposes until better mapping can be acquired. The benefits of undertaking a national topographic mapping program needs further consideration by all stakeholders in Liberia, including the concessionaires.

Lack of surveying and mapping capacity — To properly manage and monitor natural resources concessions, the GoL needs the capability to survey and map concession boundaries, community boundaries and other land-based interests. At this time, that capacity does not exist within Liberia to the extent necessary in order to establish boundary corners with repeatable accuracy. Some concession holders are able to conduct good quality surveys, but international surveyors are typically engaged to do the work.

Weaknesses have been documented in both public and private surveying capabilities. Several reports produced by the USAID-funded LPIS project reveal the extent of the problem in the Department of Lands, Surveys and Cartography (DLSC) within MLME (LPIS 2012a, 2012b and 2012c). In addition, there are both capacity-building and institutional weaknesses in the Liberian surveying community. Ford (2012) documents the low level of surveying and mapping skills of Liberian land surveyors. To remedy this situation, Ford suggests a thorough academic curriculum

to train practicing surveyors in modern methods and recommends a certificate program for student survey technicians.⁶

In addition, Ford (2012) identified as a high priority the need to reconstitute and adopt a new professional land surveyors' charter that would provide for strict enforcement of survey regulations as a means of improving the quality and raising the profile of the surveying and mapping profession in Liberia. Ford's report also contains a draft Land Surveys Act, reflecting international best practices.

Improving the numbers and quality of surveyors in Liberia will not happen quickly. It will also be necessary for the executive leadership of the MLME to learn how to effectively use surveyors who understand current surveying technology. Discussions with LPIS project staff suggest Liberian students sent to Ghana for graduate study in surveying are not effectively utilized by the MLME when they return. This indicates that not only must surveyors be trained, but government officials must learn how they can benefit from the new technology used in current survey practice.

In addition to better qualifications in surveying, promising students should be trained in land administration and land management generally. Specialists trained in land administration could be used throughout the MLME as well as in the NBC, the MoA, the Land Commission and any other government body dealing with land. Land administration/land management training should include coursework in surveying, land use planning, land economics, GIS and ICT. Programs such as that offered by the Centre for Spatial Data Infrastructures and Land Administration at the University of Melbourne should be investigated and qualified graduates should be sent to such programs for further training.

Inadequate supporting infrastructure — Some of the key stakeholders continue to be hampered by inadequate physical working conditions, including the lack of reliable electricity, water, telecommunications, office supplies, computer hardware, software, internet connections and transport equipment. In some cases, facilities are either poorly maintained or nonexistent. For example, the MLME's DLSC, located in Monrovia, has been without electricity for the past year, despite the purchase by USAID of a new generator in early 2012. It is reported that the building's wiring is incapable of supporting the necessary electrical load. Also, the DLSC is reported to have only two functioning vehicles to serve the GoL's entire field surveying tasks throughout the country. Because of this situation, the staff is unable to be as proactive or as productive as they otherwise could be. Poor salaries and incentives for government officials have additionally resulted in low morale and low productivity. Consequently, most surveyors and other qualified professionals prefer to work on private practice opportunities.

Lack of harmonized land laws and regulations — A number of international consultancies have examined Liberia's legal framework for land and mineral governance. These studies include Bruce and Kanneh (2011), Marquardt and Pay-Bayee (2011) and AFETN (2008). The recommendations contained in these studies should be studied by the NBC as it considers how the legal framework for concessions should be designed. The NBC should work closely with the Land Commission in this effort to ensure the efforts of the two bodies are complementary.

⁶ As the demand grows for higher surveying education, the program could be expanded from a two-semester survey technician program to a four-semester program that would produce survey technologists. Cuttington University and the University of Liberia are two academic institutions that may be possible locations for enhanced surveying programs.

NATIONAL CONCESSIONS CADASTRE (NCC) — TECHNOLOGY FOCUS

The USAID Governance and Economic Management Support (GEMS) Project provides the GoL with support to improve its management of natural resource concessions. The project is to develop the capacity of the NBC, the granting entities and other government agencies responsible for granting and administering concessions. One aspect of capacity development is the provision of necessary ICT

infrastructure to support the concessions granting and management processes. A national concessions cadastre is the appropriate technological infrastructure to assist the NBC and the other concession-related entities in more effectively managing Liberia's natural resources concessions, both mineral and agricultural. The implementation of the NCC is a critically important undertaking to harmonize the manner in which concessions are granted and administered by the GoL.

The NCC is a database that integrates and consolidates concession data, both spatial (maps) and tabular (attribute), into a single, unified registry. A national-scope cadastre will enable the GoL to harmonize concessions for mining, agriculture and forestry by providing consolidated access to data about the ownership, rights, obligations, duration, location, dimensions and value of individual concession areas. Incorporation of oil and gas concessions in the NCC is also planned.

The NCC is principally a tool to support management decisions, facilitate accurate access to the required concession data, screen applications and control deadlines, and to monitor and evaluate the rights and obligations of both the GoL and the holders of concessions. The NCC is not intended to serve as a title registration system; the system itself does not guarantee property rights. It is a tool to record, index and track interests held by concessionaires and allow the NBC and the concession-granting entities to more efficiently plan for future concessions, provide data needed to evaluate concession applications and monitor the performance of concession holders. The NCC does not diminish the authority of the granting entities to issue concessions; it augments their ability to manage concessions for the benefit of the people of Liberia.

Specifically, a well-designed NCC serving all concession entities will improve the GoL's ability to do the following:

- formally capture applications for the various types of concessions in accordance with the provisions of relevant laws and regulations;
- track and administer the legal rights and obligations of concessionaires and the GoL;
- analyze investment proposals from a strategic viewpoint;
- develop more comprehensive resource-use strategies;
- implement more sustainable development policies and projects;
- resolve problems where overlapping concessions occur;
- negotiate concession agreements to greater advantage than is currently possible;

What is a Cadastre?

[A c]adastre is a methodically arranged public inventory of data concerning properties within a certain country or district, based on a survey of their boundaries. Such properties are systematically identified by means of some separate designation. The outlines of the property and the parcel identifier normally are shown on large-scale maps which, together with registers, may show for each separate property the nature, size, value and legal rights associated with the parcel. It gives an answer to the question[s] where and how much.

Henssen, J. 1995. Basic Principles of the Main Cadastral Systems in the World. In *Proceedings of the One Day Seminar held during the Annual Meeting of Commission 7, Cadastre and Rural Land Management, of the International Federation of Surveyors (FIG)*, May 16, Delft, The Netherlands

- communicate more effectively with local communities and private land owners;
- award concessions in a clear and transparent manner;
- track the lifecycle of concession contracts and licenses;
- gain access to up-to-date information for potential investors and GoL financial planners;
- regulate and monitor concession operations;
- enable the boundaries of each concession to be spatially indexed to map coordinates;
- illustrate the presence of overlapping concessions, thus reducing land use/land rights conflicts;
- register changes and updates to concession rights and obligations whenever rights are altered or a concession owner is changed;
- advise the granting authority on whether or not a license application is technically admissible;
- ensure compliance with payment of fees and other requirements to keep a concession title valid;
- monitor the expiration of granted licenses; and
- provide advice to the granting authority when concession titles should be canceled.

A Business Area Analysis (BAA) is the first step toward the development of the NCC. The GoL should engage a team of experts in cadastral systems and ICT generally. The experts can be from the same firm, or they can be selected individually to form a comprehensive team. It is also possible to use a cadastral systems vendor to conduct the analysis.⁷ The steps to be followed in the BAA are essentially as follows:

- Assess and document the geospatial (graphic/map) and tabular data requirements of the concession-granting entities, plus other entities involved in concession granting, management or monitoring, as well as affected communities and other citizens. The assessment should address the types of data required, characteristics of the data, update frequency requirements, sources of the data (i.e., the agencies responsible for the data), access permissions and any other issues needed to be addressed with respect to map and tabular data needs for awarding and managing concessions.
- Assess, document and, where necessary, redesign the current business processes among the concession-granting and other related entities.
- Using the requirements determination and business process reports, prepare a conceptual systems design of the NCC.
- Based on the requirements determination, business process report and the conceptual systems design, prepare specifications for the acquisition of the software, hardware, networking and other information and communications technology needed for the NCC.
- Using the requirements determination, business process reports, the systems design and the systems specification documents, prepare an implementation plan for the NCC. The implementation plan should include cost estimates and cover all aspects of implementation, including personnel requirements, training needs and upgrades to physical facilities in addition to the standard hardware, software and networking requirements.

⁷ Often, the IT company that performs the BAA is the same firm that will provide the NCC application software because the understanding gained during the BAA is more easily transferred into the technical specifications for the operating system.

Implementation of the NCC will of necessity cause data coding schemes across the NBC and the concession-granting agencies to be standardized to facilitate data exchange. The implementation plan prepared as the last deliverable of the BAA will outline the steps to be followed and the timing of the implementation of the NCC, which will probably be done gradually as resources, both human and financial, become available. The implementation plan will also identify the recurrent costs for system operation and which of the entities involved in the concessions process should bear which costs. Each of the entities should include these costs in their annual budgets.

To avoid a potential systems failure, either through entry of erroneous data or lack of proper use of the system, the NBC should seriously consider engaging the firm that provides the system with a long-term (one to three years) contract for the start-up, operation and maintenance of the system. Ideally, this team would be drawn from the firm that provides the NCC system itself. The contract with the vendor should impose affirmative training duties on the vendor so that at the end of the contract, sufficient Liberian GoL staff are trained to operate the system effectively and efficiently.

The Importance of Geographic Information Systems (GIS) Technology

Technologies like geographic information systems (GIS) and global positioning systems (GPS) are essential to the acquisition and management of concessions data. A GIS is a computer system for assembling, storing, manipulating, analyzing and displaying data that contain physical locations (geographic coordinates, displayed in the form of maps) of features and attribute data about those features. GIS technology is important because it is able to integrate land-related data from multiple sources. To do this, the data are tied to specific reference locations on the Earth's surface. Latitude and longitude are typically used as the geographical basis for combining these data layers. Today, GIS technology is the unifying foundation for many of the world's concessions management and other land information systems. GIS is used to combine and interpret data from many different sources and formats, including satellite images, land use maps, parcel maps and various types of attribute data. GIS allows a user to create a visual overview of a concession and turn the rich spatial and attribute data in the database into reports that clearly reflect the situation on the ground. A GIS database gives a user the ability to handle multiple, robust datasets and apply rules and relationships. GIS is essentially an industry-standard technology for natural resources and general land use and management that will give the GoL a basis to make better management decisions about concessions.

The Ubiquity of GIS

Long used in environmental planning and resource management, GIS is now employed across a variety of industries such as real estate, banking and investment, insurance and marketing, to name a few of the more prominent examples. In the near future, some form of GIS software will likely become nearly as common on the desktop as word processors and spreadsheets.

Churchill, R. 2008. Part 1: The Value of GIS for Liberal Arts Education. In Knowles, A. and Hillier, A., editors, *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*. Esri, Inc.

GIS software gains much of its data analysis capabilities from its topological data structure. Topology is a mathematical approach that allows data to be structured based on the principles of feature adjacency and feature connectivity. It is in fact the mathematical method used to define spatial relationships. Without topological data, such as in a non-spatial database management system, most GIS data manipulation and analysis functions would not be practical or feasible.

By using GIS technology, the NCC will be able to use spatial indexing to track the location of concessions and to link the legal and financial obligations to each corresponding concession. Each granting authority will thereby have access to spatially-referenced data about the ownership, location, dimensions and value of all other concessions in Liberia. When historical data are entered into the NCC, the GoL will have the ability to see existing land conflicts. Basing the cadastre on geospatial technology will also enable the GoL to integrate concessions data with other land information systems that are presently under development in Liberia.

The NCC should also be a web-based system to enable the sharing of data across the departmental borders of the GoL concession entities and stakeholders, including organizations external to the GoL (e.g., the public, communities and investors). Geo-referenced data connect concessions databases residing in the different departmental systems.

For GIS applications such the proposed NCC, the world standard is Esri technology (Tennant, 2011). The GoL is strongly advised to adopt this Esri technology standard to facilitate the NCC requirements as well as those for all future supporting geographic information systems in Liberia. Examples of other geospatially-referenced systems where inter-connections will be needed include the Esri-based system, Open Title, which is now the foundation for the title/deeds registration system at the National Archives. This is part of the USAID-funded LPIS project. Another example is the Esri-based forestry information system that is currently being redeveloped at the FDA with assistance from the USAID People, Rules, and Organizations Supporting the Protection of Ecosystem Resources (PROSPER) project. With an Esri-based system, data sharing among the NCC, Open Title and the forestry information system will be simplified.

The use of GIS technology does not in and of itself require changes in legislation. However, as spatial data are shared and access to the database is requested (and at times demanded) by more and more users, legal and institutional reform may be needed to allow and facilitate the greater exchange of data. Under the model for the NCC proposed in this document, one NCC will be developed under the general supervision and control of the NBC. However, each concession-granting agency will be connected to the system and will be responsible for input and maintenance of its own data. Any needed legal changes to implement this model will be identified as the system is designed and developed.

The Mining Cadastre Information Management System (MCIMS)

In 2009, a GIS-based Mining Cadastre Information Management System (MCIMS) was successfully implemented in the MLME. This system was specifically tailored to manage and track Liberia's mining concessions, and it continues to function at this time. USAID funded the MCIMS project at a cost of USD \$600,000. A South African company, Spatial Dimension, was awarded a sub-contract to implement its Esri-based off-the-shelf FlexiCadastre software. FlexiCadastre is specifically designed for managing natural resources concessions. Additional expenditures were paid by USAID to build a new work facility at the MLME to house the MCIMS. The MCIMS was designed to enable the following:

- processing license applications;
- systematically monitoring the operations of all license holders and their compliance with the laws and regulations;
- verifying licenses automatically; and
- facilitating access to up-to-date information for potential investors.

Due to the lack of a maintenance budget, the MCIMS has not achieved its full potential. This is not the fault of the system itself or of the people who operate the system on a daily basis. The

MCIMS was well-designed, well-planned and very well-implemented. The system provides the tools necessary for the MLME to do a better job with respect to granting and managing concessions.

The MCIMS continues to function with reasonable success, although the license fees must be renewed and it must be maintained to ensure that it remains effective. The initial software maintenance period expired in August 2010, and since then the Ministry has been unable to allocate the budget (about USD \$20,000) needed to maintain the MCIMS. Specifically, the MLME has not paid the MCIMS's on-going annual software maintenance fee to the system vendor, which, by international standards, is considered a normal operating cost for such a system. Consequently, the MCIMS has been "limping forward" since the expiration of the first year's software maintenance agreement. Since then, on two occasions outside of any contractual obligations, Spatial Dimension made pro bono updates and fixes to the system.

It is understood that the MLME has been unable to extract data from the MCIMS regarding overlapping concessions, although the system does contain the necessary data. It appears the MLME requires technical assistance in order to produce the needed reports; however, since the MLME has not paid the US\$20K annual software maintenance fee to Spatial Dimension, the MLME cannot turn to the company for help.

In addition, under the original contract in 2009, Spatial Dimension implemented a web portal for the MCIMS as a means to communicate to the public information about mining concessions. The website was intended to display maps and details of concessions and allow for the download of the documented business procedures to apply for mining concessions. This important public awareness tool was mainly intended to demonstrate transparency in the concessions award process, but, unfortunately, the web portal was never launched. A check of the current MLME website (<http://www.molme.gov.lr/index.php>) reveals nothing about the MCIMS or the original web portal.

In addition to these system-related problems, financial constraints have made it difficult for the MLME to establish a dedicated and recurring annual budget for MCIMS staff salaries, consumables and other expenses related to the operation of the MCIMS. The USAID-GEMS project is a resource upon which the MLME may draw for at least some assistance to help bring the MCIMS back into full functionality.⁸

National Roll-out of the Mining Cadastre Information System

There are limited choices in the open market for companies that provide off-the-shelf concessions management systems. The requirement for an Esri-based, web-enabled system narrows the choices even further.

The GIS-based MCIMS appears to be well-suited for use as a model for an NCC that would serve all GoL concession-granting authorities. The MCIMS implementation was a very difficult undertaking, especially given the challenging levels of institutional and human capacity in Liberia. The MLME continues to use the system to log concession applications and perform basic mapping despite the lack of system maintenance and upgrades. Consequently, the system's resiliency is a good indicator of FlexiCadastre's robust technical design and its well-executed

⁸ The GEMS project submitted a plan for immediate next steps for the rehabilitation of the MCIMS to MLME Deputy Minister Sam Russ in March 2013. The GEMS project is ready and able to implement that plan.

implementation by Spatial Dimension. The simple fact that the FlexiCadastre system has been successfully implemented in a GoL ministry is a prediction that a further successful roll-out into additional GoL agencies is not only possible, but likely to succeed. During the design and development of the MCIMS, Spatial Dimension assisted MLME with the prerequisites necessary for successful implementation, including installation of needed physical infrastructure and development of human capacity. The expansion of the existing technological foundation of Liberia's MCMIS to serve the other concession granting authorities would provide a harmonized approach to the NCC. Therefore, the USAID-GEMS project recommends Spatial Dimension be re-engaged to build on the existing FlexiCadastre-based MCIMS to implement the NCC.

The MCIMS was developed for the MLME as an intranet web site. This means that the software and database are installed on a single server inside the Ministry, and any authorized user can access it using nothing more than a web browser on a local computer. Being an intranet site, rather than an internet site means that it is not publicly accessible, and access is restricted to computers that are located on the Ministry's own network. Security is managed by the network domain security policies. The advantages of this architecture are as follows:

- The software is installed, configured and maintained on a single server. Any enhancements or configuration changes to the software on the server are immediately available to all users. The users need do nothing. This includes users in remote offices.
- Users do not need to install any software on their computers. A simple browser (Internet Explorer) is all that is required. This means that the client computers do not need to be powerful machines to run complex software, and there is no problem with other software on the computer causing problems. Also, it is not possible to have different (sometimes conflicting) versions of the software on different computers.
- The database is centralized and updates happen in real-time. This is essential for first-come, first-accessed policies in mining cadastre. There is also never a situation in which more than one version of the data exists that could get out of sync. Backing up data can happen in a controlled fashion from a single location.
- Users in remote (up-county) offices can be added to the system when a Wide Area Network (WAN) is in place. No servers or high-end computers are required in the remote offices and no installation is required.

The advantages of the web architecture can be leveraged even further by moving the centralized software and database from a local web server on the Ministry's network to a cloud server accessible through the internet. In this situation, the web server is located at a commercial data center rather than on a physical server managed by the Ministry. Advantages of this architecture include:

- The application is accessible from any computer anywhere, as long as the user has access to the internet. The user no longer needs to be on a computer attached to the Ministry's LAN/WAN.
- Security is implemented in a number of layers, similar to internet banking sites.
- Using a cloud server rather than a physical server makes it easy to scale up as more users are added to the system. Adding additional processing power to the server becomes a trivial process managed through a web page.
- Need for IT support is reduced. A cloud server provided by a data center will have significantly better up time than a locally managed server. A power outage at the head office of the NCC will not prevent the system being used by a remote office.
- The application is more easily monitored and managed by suppliers, allowing for rapid response to any issues that might be experienced.

- Users in remote (up-county) offices can be added to the system when they have internet access of sufficient bandwidth. No servers or high-end computers are required in the remote offices and no installation is required; provided, however, the links between the server and the client are sufficiently robust to carry the data at acceptable speeds.

In Liberia, FlexiCadastré was installed as an intranet web site within the MLME. Spatial Dimension has a number of clients that use FlexiCadastré in the cloud, and so the cloud option is available for Liberia.

These web-based, distributed systems may be compared with client-based solutions, or client-server applications, which require software to be installed on each computer that needs to access the system. In a client-server environment, data are often stored locally. Some clear disadvantages of this approach are the following:

- If multiple users need to use the software, they each need to install, configure and maintain the system on their own computers.
- If multiple users need to share data, complex routines for exporting and importing data need to be managed. This also complicates first-in, first-accessed principles when remote sites are added.
- Until the data have transferred, many users will be working with data that are out of date.
- Transferring data using text (XML) files (via thumb drive or email) leaves it susceptible to corruption and/or tampering, as well as being a clear security loophole.
- To back up data properly, it will need to be backed up from each user's computer separately.
- When a software update is available, each user needs to be notified to download, install and configure the new version. Depending on the complexity, this could require a system administrator to visit each user individually (even in remote offices).

Document Management System

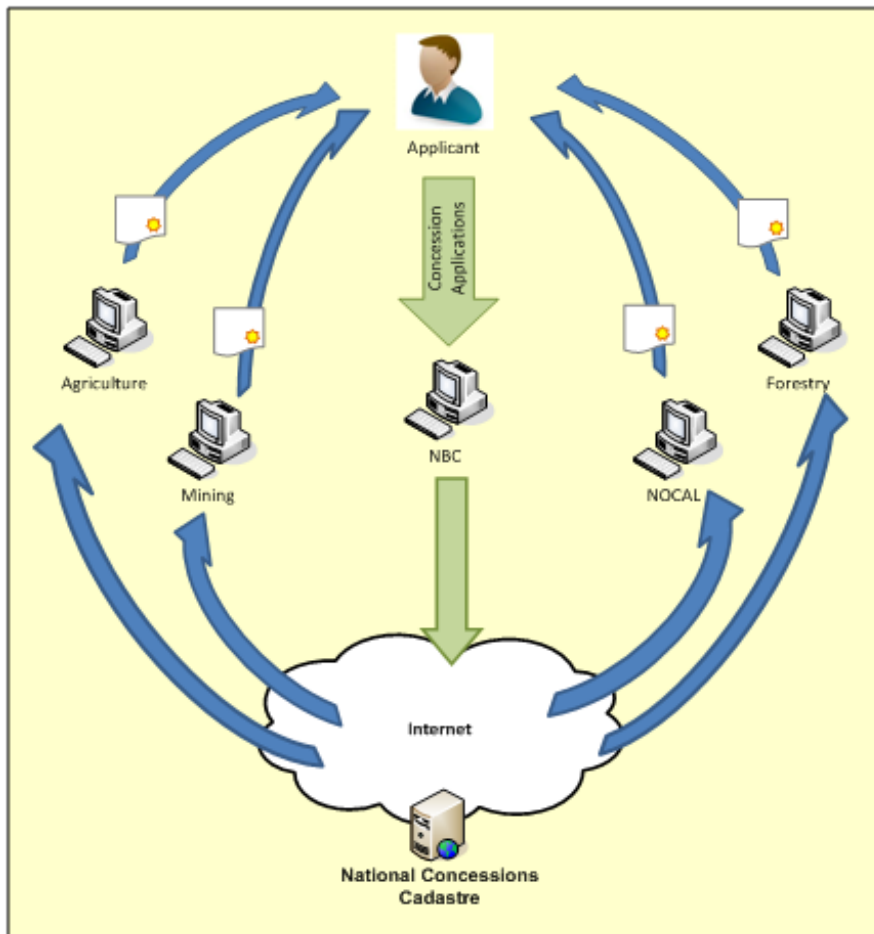
Concessions in Liberia have been, and still are, dependent on paper records. The vast majority of the existing records contain the details of legal agreements and obligations of the parties (i.e., the GoL and the concession holder). They are also important because they represent legal evidence of the transactions that established the concessions. In some respects, the documents are akin to the records of a deeds registry in that they give evidence of property rights in natural resources. The preservation of these records is critically important to the protection of both parties. Many of the concessions are of long-term duration so they must be included in any future concessions management system. It is therefore recommended that the NCC also be designed to integrate and manage these historical documents. An integrated digital document management system (DMS) is an appropriate component of the NCC. The pages of each agreement are digitally scanned, cataloged and consolidated into a digital file, which is then linked to its corresponding concession record in the NCC. Since the NCC will be a GIS-based system, it follows that all the scanned documents will be geo-referenced. In addition to ensuring the preservation of the records, this process will facilitate the subsequent retrieval, analysis, publication and distribution of the records for each concession. The system offered by Spatial Dimension is designed to be integrated with most of the widely-available document management systems on the market.

Procedural Changes to Current Concessions Processes

The central purpose behind implementing the NCC is to create an integrated system that serves all of the granting authorities in Liberia as well as the NBC. Currently, applications are first sent to each of the individual granting authorities. This administrative procedure should be changed so

all applications are first sent to the NBC. Before any application is registered, it should be assigned a unique code given by the central office — an approach that offers significant protection for those served on a first-come, first-served basis. In addition, any cadastral analysis to determine if licenses or applications overlap should be restricted to the NBC, meaning that an individual granting entity should not approve the availability of a specific area or grant licenses without clearance from the NBC. If there are no conflicts, then the application will be forwarded to the granting authority for normal processing. If the NBC detects a conflict (e.g., overlap), then the application will be suspended until the affected entities resolve the problem. Clear policies for dispute resolution must be drafted to guide the GoL toward optimal solutions of these situations. Conversely, each granting agency should notify the NBC when concessions are approved (ideally this would be done through workflows in the system). These procedural changes are not designed to infringe on the mandates of individual granting authorities. They are simply intended as administrative procedures to help eliminate the problem of overlapping concessions and reinforce the role of the NBC as the agency with the overall view of all concessions in Liberia.

Conceptual Design of the NCC



TECHNICAL TASKS TO IMPLEMENT THE NCC

TECHNICAL TASK 1. — Re-engage Spatial Dimension to re-energize the MCIMS. The first step is to bring the Spatial Dimension account up-to-date by paying the annual software maintenance fee. Spatial Dimension should also be engaged to review the current status of the MCIMS to determine any remedial tasks required to bring the system up to its full capabilities.

TECHNICAL TASK 2. — Prepare Statement of Work (SOW) to conduct the BAA for the NCC. The GoL should commission the BAA⁹ to give a clear picture of the operations and management of concessions in Liberia. The study should include the tasks listed above in the section entitled National Concessions Cadastre (NCC) — Technology Focus.

The expected outcome of this task will be a requirements determination, business process re-engineering analysis, conceptual systems design, systems specifications and an implementation plan. A cost estimate should also be prepared as part of that consultancy. Based on the outcome of the BAA, the GoL and the donor community can decide whether or not to proceed. Regardless of the system implemented for the NCC, this BAA is necessary in order to make an informed decision about the design of the supporting ICT infrastructure for concessions management in Liberia.

TECHNICAL TASK 3. — Select consultant[s] to perform the BAA. This task will require the preparation of the Request for Proposals (RFP), publication of the solicitation notice, bid selection, bid negotiation, bid award, notice to proceed, and vendor mobilization.

TECHNICAL TASK 4. — Review BAA technical and cost proposal. A review committee should be convened to evaluate the results of the BAA study, to make any necessary corrections, and issue a go/no-go recommendation to the GoL. If a no-go decision is advised, then the committee will be expected to give direction regarding an alternative solution.

TECHNICAL TASK 5. — Prepare bid solicitation. If system acquisition/upgrade is approved by the GoL or USAID, a bid solicitation document should be prepared in which the required tasks, equipment specifications and services are clearly defined. The bid request should be issued on a not-to-exceed cost basis as this approach worked well for the initial solicitation for the MCIMS. The results of the BAA study and the recommendations of the review committee will form the basis for this bid solicitation document.

TECHNICAL TASK 6. — Prepare a procurement plan. If a “go decision” is made, then a detailed procurement plan will be needed to clearly identify the system’s technical requirements, locate suitable suppliers, and to coordinate the procurement process with other critical path activities such as work space renovations. The procurement plan should also provide technical standards for ICT equipment to ensure a common operating environment for the NCC.

TECHNICAL TASK 7. — Prepare the NCC implementation team. The NBC and granting entities need to create a joint technical working team to represent their collective interests in the design and implementation of an NCC. This team will work closely with the IT consultants during the process to design and implement the NCC. Likewise, the joint technical working team will need to work closely with the selected NCC vendor.

TECHNICAL TASK 8. — Prepare detailed staff requirements. The implementation of the NCC in the granting authorities will require additional staff to make the system function at an

⁹ Alternatively, this task may be performed by the GEMS project with the concurrence of the NBC.

optimal level. This task will outline these staffing requirements and provide detailed job descriptions for required personnel. Preparing documents that justify the hiring of these personnel may also be required by the appropriate human resources departments. With the original MCIMS, the GoL sent personnel abroad for specialized training. The same approach will be needed for staff in each granting authority to achieve a successful roll-out of the system.

TECHNICAL TASK 9. — Establish a public register for concessions. The application of nondiscretionary, consistent procedures as part of the NCC are critical to ensure transparency in the granting of natural resources rights; to guarantee the security of tenure; to communicate to the public, especially local communities; and to facilitate the management of competing land uses. This needs to be an integral part of the NCC; it will be the public’s window into the NBC. A website similar to the one that was originally planned for the MCIMS implementation will serve as a model. This will be part of the MCIMS rollout.

TECHNICAL TASK 10. — Prepare a physical infrastructure plan for the NCC. With the exception of the MLME, which already has a new work facility for its mining cadastre, the other key agencies will undoubtedly require the construction of suitable work spaces to accommodate the NCC’s hardware and software equipment, as well as accommodate the daily workflows to support the operation of the NCC. Electrical supply, air conditioning, office equipment, filing cabinets, desks and chairs, and the like will need to be clearly specified.

TECHNICAL TASK 11. — Prepare technical survey mapping standards and regulations. The boundaries of all concessions should be demarcated on the ground with permanent monuments or beacons. To ensure that the field survey procedures are conducted in a manner that produces consistently accurate measurements, the GoL will require technical standards and regulations to guide surveyors in their fieldwork. Regulations are required to define the official geodetic reference foundation (datum) upon which all survey measurements shall be based. The survey regulations will also regulate the type of allowable surveying equipment used to acquire field measurements, the type of monuments and the methods used to install them, the professional qualifications of surveyors, and the procedures by which the GoL reviews and approves the surveys records and plans. These records and plans must become part of the concession records and must be included in the cadastre. It is important to note that the DLSC currently lacks the capacity to conduct these field surveys or review and approve the technical quality of the field surveys.

Major efforts to develop surveying capacity are required to elevate the DLSC to international professional standards. Similarly, the private-sector surveying community in Liberia is unable to perform these requirements to international standards. Also, in recent times, the professional surveying industry in Liberia has developed a rather dubious reputation regarding transparency and professional conduct. USAID’s LPIS Project has made a number of excellent recommendations to improve the professional surveying capacity of Liberia, but such improvement will be a long-term process. It is recommended that the GoL engage an international professional surveying company to execute these surveys to the necessary level of competency. The international surveying company should have, as part of its scope of work, the training of Liberian surveyors and survey technicians.

TECHNICAL TASK 12. — Overhaul Liberia’s capacity for surveying. In 2012, the MCC’s Liberia Threshold Program commissioned the LPIS program to prepare a report titled “Final Report-Institutional Strengthening Report for the Department of Lands, Surveys & Cartography.” The report was submitted to the Land Commission, and it outlines a number of actions necessary to improve the DLSC’s capacity for carrying the field surveys that an NCC will assuredly require. To summarize, the DLSC’s staff lack the skills and competencies in modern mapping and

surveying technologies and techniques to utilize fully state-of-the-art technology in cartography, cadastral surveying and database management. They lack the IT competency necessary to develop and maintain a modern cadastral database and the legal competency needed for adjudication and participation as expert witnesses in court cases. The skills to operate GIS software and Microsoft Office programs are also lacking in many cases. Thus, it is highly recommended that the GoL implement the recommendations contained in the LPIS report.

TECHNICAL TASK 13. — Implement the cadastral unit (CU) concept. Note: the following indented paragraphs are quoted from Girones, *et al.* (2009: 17, 18); that material is presented here for consideration by the GoL as a possible move toward adopting international best practices for managing all types of concessions in the NCC.

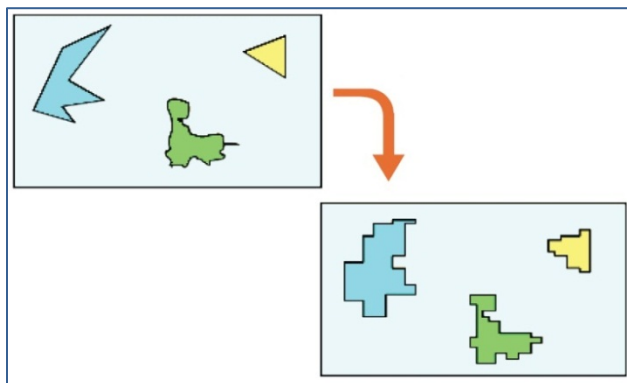
One of the most innovative and efficient concepts introduced in the management of mineral rights is the cadastral unit (CU). A CU is a quadrangular polygon with constant (or pseudo-constant, depending on the type of projection used) dimensions that is referred to and has a fixed position within a system of coordinates. The definition of a CU should be included in any legal framework, and cadastral procedures should provide technical details about the delimitation of mineral licenses.

Before the CU concept was developed, many countries had no restrictions on the shape, geometry, and position of mineral rights, leading to a number of problems, including frequent overlaps between adjacent concessions and the presence of areas (depending on the rules of each country) that were geometrically blocked for applications. The concept of a CU has been successfully introduced around the world under various names, including the cuadrícula in Bolivia and Peru; the carré in Madagascar, Mauritania, and the Democratic Republic of the Congo (DRC); the bloco in Mozambique; and new CUs currently being adopted in Mongolia, Nigeria, Zambia, and many other countries.

The evolution of a modern CU began with restrictions on the geometry and positioning of mineral rights that began appearing around the world as soon as the first modern topographical maps were available, at the end of the 19th and beginning of the 20th century. These restrictions required the borders of the surface areas of mineral licenses and mining rights to be polygonal, regular, and parallel to the coordinate system used in national maps.

Evolution from Non-restricted Polygon Rights to Cadastral Units

(Source: Girones *et al.* 2009)



These conditions were soon expanded to include requirements that polygons should have minimum dimensions. The minimum size of a single mineral rights area would equal the dimensions of the CU; for instance, if a CU were 500 meters x 500 meters, then that would be the minimum area allowed for a license. Any mineral licenses should always be made up of a certain number of CUs; thus the dimensions of the sides of any polygon corresponding to a mining license and mining rights will always be in multiples of a single side of the CU (that is, 500 meters, 1,000 meters, 1,500 meters, 2,000 meters, and so on; . . .).

The final step in the evolution of a modern CU was the requirement that polygons corresponding to mining licenses and mining rights cannot float and be placed anywhere. Rather, they must always be located coherently within a predefined and standard grid These grids can be mining specific (exclusively designed for the mining cadastre) and drawn over national maps, as is the case in Bolivia and Peru, or they can be generic, using the standard grid that is usually represented in topographic maps, as in Madagascar, Mauritania, and Mozambique.

If Liberia decides to implement a CU indexing scheme for concessions, the transition will need to be authorized in GoL regulations that define concessions, and in any existing or future land surveying regulations. Existing concession boundaries will need to undergo a process to transition them to a CU system. In 2004, NOCAL divided Liberia's offshore territory into a grid system comprised of 17 blocks; in a sense, this can be regarded as a CU system.

TECHNICAL TASK 14. — Establish a national geodetic control network throughout Liberia. This task provides the infrastructure needed to survey concession boundaries with a suitable level of accuracy. The USAID LPIS project is currently implementing this survey control network whereby one high-accuracy monument will be installed in each of Liberia's counties. This control network will satisfy the needs for accurate concession surveys for the entire country. It is understood that LPIS will complete these works before the end of April 2013. However, there appears to be a budget shortfall to complete the control survey measurements, so the LPIS is trying to locate supplementary funding. The estimated cost of the entire effort is about USD \$150K but the LPIS budget only has about half of that available. This effort is a critical task that needs to be completed before many of the other important tasks for the NCC can be undertaken. Finding the extra funding is therefore of great importance.

The LPIS Project also plans to install one Continuously Operating Reference Station (CORS) in the region of Monrovia. This is a special, ultra-high accuracy survey station that broadcasts positional correction data to remote GPS survey equipment throughout the country. The CORS will be very useful for positioning seismic survey ships and drilling rigs for offshore exploration and exploitation.

TECHNICAL TASK 15. — Re-Survey all existing (and future) concession boundaries. One of the essential activities of the NCC is to fix and delimitate the position of concessions which, typically, do not have visible physical boundaries. This requires the effective and knowledgeable use of cartographic and geodetic techniques. In Liberia, the lack of adequate topographic map coverage and a developed geodetic control network has led to the inaccurate positioning of licenses and frequent conflicts, resulting in the insecure tenure of title holders. The use of satellite images along with GPS and GIS technologies can help compensate for some of these deficiencies, but actual demarcation of boundary corners on the ground is the best way to minimize conflicts with neighboring land uses.

Concessionaires usually submit the coordinates (latitude/longitude) of the corners of concession boundaries at the start of the application process. Sometimes these corners are marked on the ground by monuments but often their positions are simply derived theoretically from satellite imagery. The actual field verification of the coordinates of these boundary corners has, historically, been a hit-or-miss activity depending on the granting authority. Therefore, the boundaries of all concessions should be re-surveyed to verify their actual position, and proper, enduring, monuments should be installed to permanently mark their location. This is a major undertaking, yet there is no other way to reasonably define concession boundaries. There is no capacity in Liberia to undertake a major surveying program like this, so an international surveying and mapping company will need to be engaged to carry out the work. This task will benefit from having access to the high-accuracy national geodetic control network mentioned above. This would be an excellent opportunity to train Liberian technicians in the use of modern surveying methods.

TECHNICAL TASK 16. — Undertake a national survey program to demarcate customary lands. Of great significance to ongoing land disputes in Liberia is the fact that the GoL is currently unable to mark the boundaries between many public and customary lands. Clear evidence of this problem was revealed by a USAID-funded pilot project in 2012. In that project, an inventory of Tribal Certificates held by individuals/communities in three Liberian counties was conducted for the Land Commission.. The project recorded 404 certificates, yet only 15 were deemed to be acceptable — the rest were invalid (LPIS 2011).

This survey confirms that during the process to award concessions, the boundaries of customary land are usually unknown to either the granting authority or the applicant for a concession. Presumably, the customary lands are well-known by the people who have enjoyed their use for generations. As such, concessions are regularly granted to commercial interests without due regard for their impact on customary land ownership. Rights to customary land include rights of the community as a collective land owner and rights of groups, families and individuals within the community. Unclear and conflicting land use rights are the root causes of disputes among the concessionaires, investors and developers, and the people who customarily derive their livelihood from the lands where the concessions have been allocated.

It is recommended that the GoL undertake a program to define the boundaries of customary lands. This will serve to illustrate to the granting authorities and the concession holders where prior land claims exist and thereby reduce the opportunity for conflicts with local communities. To be clear, this means that the boundaries of customary lands claimed by local communities and tribes need to be surveyed. As stated previously, this task will benefit from having access to a high-accuracy national geodetic control network in Liberia. As also noted previously, there is no existing capacity in Liberia to accomplish the undertaking, so it will require the services of an international surveying company.

In some cases where the demarcation of customary lands is contested, an adjudication process will be necessary in each community to achieve a definitive boundary. This task will require active participation by the community, neighboring communities and their members including elders, chiefs, youth, women and local authorities.

TECHNICAL TASK 17. — Undertake a national survey program to demarcate protected/restricted lands. As was the case with respect to customary lands, the exact location of the boundaries of protected and restricted areas must be accurately mapped. The problem of concessions being granted on protected lands was discussed in the Critical Issues section, above.

TECHNICAL TASK 18. — Public awareness campaign. Experience in other countries has shown that a vigorous public awareness campaign should precede any demarcation program in a community in order to lessen the fears of indigenous people. It is recommended that the GoL start this effort slowly and gradually, commencing with one local community, gaining the trust of the people in that community, and then gradually expanding the program throughout the entire country. The importance of a carefully planned and executed public awareness campaign cannot be overstated.

TECHNICAL TASK 19. — Acquire national topographic coverage (satellite imagery). Accurate large-scale (e.g., 1:10,000) digital map coverage of the entire country is a highly useful foundation for displaying and analyzing the concession boundaries. It is also useful for many other purposes, such as transportation planning, locating cell towers, mine-development planning, forest harvest planning, hydrological studies, and many others. The use of airborne LiDAR¹⁰ mapping would be the most effective approach because the technology would reveal actual ground elevations (and therefore contours) instead of just the top of the dense canopy of trees and foliage. However, the costs to acquire a national digital map coverage derived from LiDAR will likely be in the order of 6,000,000 USD. Moreover, the task will require a year or more to collect and process the LiDAR data and to produce a clean topographic base map of the country. The GoL is advised to conduct a cost-benefit study to examine the potential return on investment (ROI) of a national airborne LiDAR mapping program.

In the meantime, a digital base map is still required to launch and to use the NCC. Therefore, low-cost satellite imagery will serve the basic purpose to locate concession boundaries, roads and communities. It is recommended that recent satellite imagery be acquired from a commercial provider for use as the temporary GIS base mapping for the NCC.

TECHNICAL TASK 20. — Prepare a human capacity development plan. Each granting authority and the NBC will require competent staff to operate, maintain and effectively utilize the GIS-based NCC. Each organization will need at least one, preferably two, NCC system managers skilled in the use of ICT, with a special focus on GIS skills. When the MCIMS was implemented in the MLME, the designated system manager underwent a six-month GIS training program in Australia. Therefore it is strongly recommended to duplicate this training program for a number of Liberians to serve in the essential positions to operate, maintain and manage the NCC over the long-term. Additional support staff be required as well, including legal and paralegal staff, data entry clerks, administrative clerks, and hardware/network technicians. The human capacity plan should address issues of academic and vocational training, staff retention, continuing education, job classification, and pay grades.

¹⁰ Airborne LiDAR (Light Detection and Ranging) sensors are used to create DTM (Digital Terrain Models) and DEM (Digital Elevation Models) for topographical mapping even in heavily forested areas where it is able to measure the height of the forest canopy as well as the ground elevation. A reference point is needed to geo-reference the collected data; these reference points are discussed previously in Technical Task 14.

INSTITUTIONAL FACTORS AFFECTING THE NCC

It is an axiom among systems professionals that systems implementation efforts generally do not fail for technological reasons; they fail because of institutional reasons. Thus, the institutional aspects of NCC development are critical for its success. The GoL's vision for economic and social growth will depend on making a number of critical institutional and political changes to enable implementation of the NCC. These include, among others, a strategic, coordinated vision and policy for concession sector development, a supportive institutional structure, consistency within the legal framework, well-crafted and enforced regulations and the human capacity to deliver the managerial and operational programs needed to succeed. Long-term initiatives are required for institutional, legislative and policy reforms and on building the GoL's capacity to effectively utilize the information to be derived from the NCC. The GoL, with the assistance of its international development partners, has made significant progress toward achieving institutional reform.

While progress has been made, a number of steps can be taken to improve the institutional environment for concessions governance. These include the preparation of a national policy to govern concessions, continued work to harmonize and update the legal framework for concessions and strengthening the NBC to it may more effectively perform its duties as the national coordinator of concession-related activities in Liberia. The NBC should be recognized as the lead GoL agency to coordinate the concessions, including mining, agriculture and forestry. Although petroleum/gas is the responsibility of NOCAL, its relationship with the NBC should be no different than the other types of concessions. The NBC should be regarded as the collective voice that represents the overall best interests of the GoL with respect to concessions.

The NBC and, by extension, the NCC, should be financed through concession-generated revenues. Girones, *et al.* (2009) state the revenues generated by a standard level of mining activity (sometimes combined with a percentage of the royalties) should be sufficient to guarantee the financial resources necessary for management of the entire mining sector, including cadastral activity, geological survey, mining inspection and environmental monitoring. Thus the activities of the NBC should be fully funded from concession revenues.

The NBC should be the custodian of the NCC and be responsible for its operation and maintenance, although each of the concession-granting agencies will be responsible for its own data collection and input. Within the NCC framework, the granting entities will continue to manage their respective concession operations but they will collectively benefit from the oversight of the NBC. The exact details of the working arrangements between the NBC and each granting entity need to be established as the NCC is implemented.

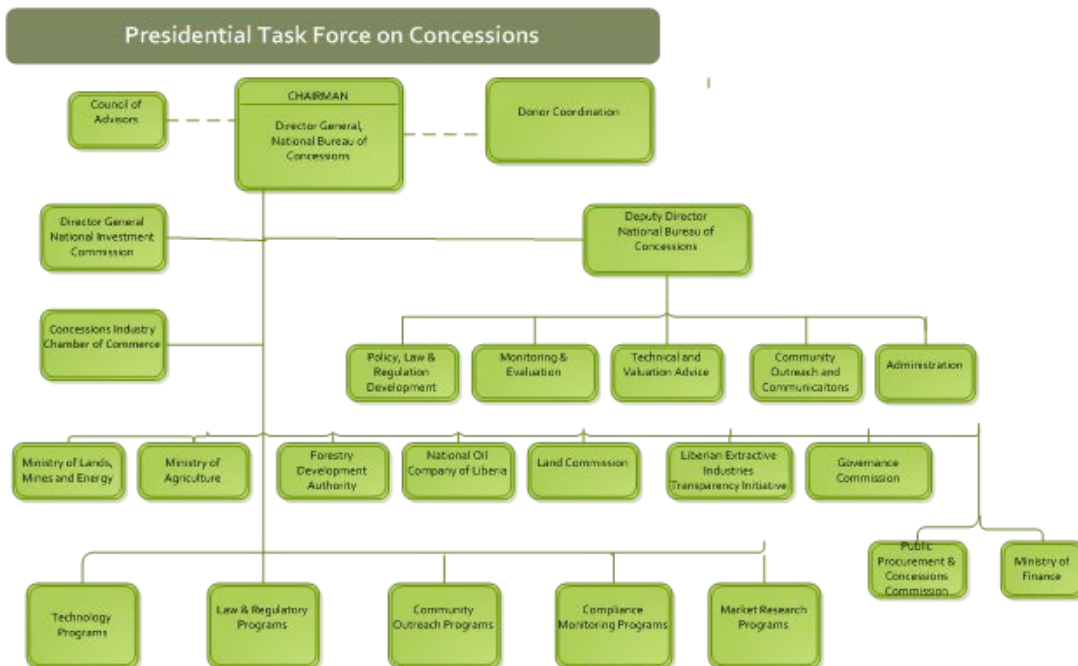
PROPOSED PRESIDENTIAL TASK FORCE ON CONCESSIONS

The relatively underdeveloped state of institutions and systems within the GoL is a barrier to the natural resources sector achieving its intended goals to support economic and social growth. Strengthening these systems and institutions is critical to implementing needed reforms and strengthening economic performance. In order for the necessary reforms to succeed, the nation's top leadership, including the President, must actively support needed institutional change and urge GoL officials to adopt standards, procedures and technology consistent with international best practice. To this end, the creation of a multi-sector Presidential Concessions Task Force (CTF) is strongly recommended.

This body will be directed specifically to act on the reform of concessions administration, and will involve the different sectors of the natural resources community and GoL agencies involved in concessions management. The goal is not only to articulate the problems, but also to find, enact and implement solutions.

A Presidential Task Force has the highest profile of any commission or task force in the country, and thereby underscores the importance of the initiative and gives it credibility. In addition, a Presidential Task Force increases attention to the undertaking and therefore stimulates its participants toward more serious participation and greater contributions. The CTF's primary function will be to ensure the NCC roadmap described in this document, and specifically the various technical and institutional tasks outlined herein, are entirely accomplished. This will require a continuing strong commitment by the President and the top leadership of all participating GoL institutions to ensure the strategic national goals are met.

Presidential CTF



In the proposed CTF structure, the Director General of the NBC will serve as the Chairman. The Chairman will work closely with the National Investment Commission (NIC) to ensure the national economic objectives for the natural resources sector drive the CTF. The Chairman and the NIC will focus on strategic market initiatives and establish objectives for foreign and domestic investments. In addition, the Chairman will also serve as the primary liaison with the

international donor community to ensure that assistance programs are coordinated with regard to Liberia's strategic objectives. The Chairman will also be involved in strategic planning, market research, the introduction of new technology for concessions management, law reform, environmental protection and conservation.

The Deputy Director of the NBC will act as the focal point for implementing any tasks or actions the CTF may require. These may include establishing community outreach programs; researching the technical and market issues and finding solutions; implementing new technologies and initiating and overseeing the drafting of new policies, laws and regulations to help streamline concession processes. Monitoring and evaluation (M&E) programs will be critical in determining the success or failure of concession agreements, and M&E feedback to the CTF will help to drive remedial actions.

Directly supporting the Chairman will be the various sector stakeholders that will guide CTF initiatives and implement the activities as directed. For example, the Land Commission should play a key role in ensuring that the necessary land policy and law reforms identified in the various donor-sponsored studies actually occur.

Operating an effective Presidential CTF will require financial support from the GoL or perhaps an international donor. The GoL must establish an operating budget for this CTF.

INSTITUTIONAL TASKS TO IMPLEMENT THE NCC

INSTITUTIONAL TASK 1. — Develop a national concessions policy. The NBC should take the lead role in developing a policy on concessions for the GoL and the people of Liberia. The policy should provide over-arching guidance for all concession-granting entities and other agencies in the GoL that deal with concessions. The policy should include such matters as the goals of granting concessions; criteria for evaluating concessions proposals; the role of the NBC in the concessions selection, awarding and management processes; the rights of customary landholders in concession areas; guidance for resolving conflicts among concession holders; public access to concession agreements and other concession-related data; and responsibilities of the GoL and concession holders. The policy development process should include stakeholder meetings throughout Liberia with representatives from all segments of Liberian society.

INSTITUTIONAL TASK 2. — Review the legal framework of concessions. This review should be comprehensive, and should include an analysis of the laws in the mining, forestry and agricultural sectors, as well as any concession-related legislation. This review should recommend changes to harmonize inconsistent laws, repeal laws no longer needed and include necessary changes due to the enactment of recent laws. Legal changes to ensure the sustainability of the NBC and the NCC should be specifically included in recommended changes. The review should also examine the need for legislative approval of concession agreements and make any needed recommendations.

INSTITUTIONAL TASK 3. — Build the capacity of the NBC. As the NBC evolves in its mandated roles, the organization will need to develop the capacity to serve its “clients,” which include the concession-granting agencies, the NIC, the IMCC, government leadership, the private sector, local communities and the public. The NBC will need to clearly define processes and establish priorities, functions, tasks, activities and support systems required to support each of its “clients.” Also, the NBC will need to hire competent senior professional staff in strategic areas, such as in mining, agriculture, forestry, petroleum, environment, legal affairs, economic and financial analysis, natural resource management and ICT. Not the least of importance, the NBC will require strong capacity in monitoring and evaluation and concession contract compliance. While the NBC does have a monitoring and evaluation director, considerable work needs to be accomplished to create standard indicators for each type of concession. Finally, the NBC must create an internal IT department to support the operation, maintenance and effective use of the proposed GIS-based NCC.

The NBC’s role in the concessions process is strategically important to the GoL as it pursues the country’s goals for rapid economic and social growth. Accordingly, the NBC’s Director General position should be elevated to a legislative cabinet position. As the best-informed advisor on concessions — and on natural resources overall — the Director General will be in a position to give direct advice to the most senior levels of government. In this way, strategic-level decisions will be made on the basis of the best available, unfiltered information. In a Cabinet level position, the Director General will be able to receive unfiltered direction from the President and other members of the Cabinet.

INSTITUTIONAL TASK 4. — Prepare and sign inter-agency cooperating agreements for the NCC. The institutional structure of the NCC should be regarded as a consortium or syndicate comprised of the NBC and the four granting entities to promote the common interest of coordinated management of Liberia’s natural resources. Each granting authority should enter into an agreement with the NBC to govern the relationship between the authority and the NBC. These agreements should be executed at the Ministerial level (or equivalent) in each agency.

INSTITUTIONAL TASK 5. — Establish cooperative agreements between the NBC and education institutions. Significant efforts will be required to create sustainable, institutionalized, prioritized training programs in the natural resources and land management sectors — including surveying, mapping, ICT, GIS, land planning and land management. Sustainable training programs for key actors and institutions within these sectors should be developed in cooperation with appropriate educational institutions at both vocational and higher-education levels. It is strongly recommended that the GoL seek assistance from the international donor community to build the necessary training programs in Liberia, as well as establish opportunities for Liberians to study abroad. Partnerships with university programs having strong international representation, such as the Centre for Spatial Data Infrastructures and Land Administration at the University of Melbourne, should be actively investigated.

INSTITUTIONAL TASK 6. — Create a Community Engagement Department within the NBC. Local communities should be included as key participants in the negotiation of concession agreements, regardless of whether they are re-negotiated or new. If this is done, the likelihood of dissatisfaction will be diminished among the parties (GoL, granting entities, the concessionaires and community leaders).

A mechanism for community-based dispute resolution is also needed within the concessions process. The GoL needs to develop a stronger capacity for community outreach programs to help mitigate the historical land-based conflicts between the GoL, concessionaires and local communities. This department would also serve to ensure that the development of natural resources is conducted according to sustainable practices and in harmony with any national and/or local conservation goals. The NBC would be a likely home for such a key group.

INSTITUTIONAL TASK 7. — Establish NBC regional offices. The NBC should explore the prospect of establishing regional offices in each county to represent the GoL and support the collective needs of the land-based granting authorities. For example, the FDA employs field representatives (forest rangers or conservation officers) tasked with compliance monitoring of forest development activities. The MLME and MoF have similar needs, as does the NBC in executing its M&E programs. These offices should be regarded as shared resources and therefore the entities should share in their operational costs. Regional offices would be highly beneficial in putting a GoL “face” to interactions with local communities for dispute resolution, public promotion, and other activities.

INSTITUTIONAL TASK 8. — Create a Concessions Industry Chamber of Commerce. Currently, there is no collective voice in Liberia that represents the needs and concerns of the concessionaires. In a recent meeting of concessionaires, hosted by the NBC, the concessionaires revealed a number of serious problems that they have in dealing with the GoL. They experience very real problems related to conflicting land uses and are disappointed in the GoL’s measures to find solutions, which they view as disjointed and ineffective. Rather than try to find piecemeal solutions by dealing with each granting authority in isolation, an industry association could effectively address the needs of concessionaires and allow them to deal mainly with only one GoL counterpart—the NBC. This Concessions Industry Chamber of Commerce may also serve as the industry’s source for dialogues with NBC on labor practices.

COSTS TO IMPLEMENT THE NCC

The cost to implement a unified National Concessions Cadastre will be significant, but the rewards from the effective use of the system will significantly outweigh the cost. When considering whether to implement the NCC, the GoL must also recognize the cost of continuing the present disjointed and inefficient concession management process. Doing nothing is also expensive, because the present “system” costs the GoL much in both lost revenue and expenses to manage the negative externalities, such as conflicts, resulting from the lack of data to manage the concessions properly.

The NCC should not be regarded simply as a computer-based system; it is much more than that. The NCC comprises the hardware, software and data needed to manage concessions, but it also comprises the human, institutional, legal and political factors that, when combined, serve to make the NCC truly functional. Liberia must upgrade these human and institutional requirements for operation of the NCC, so the cost to implement the NCC must encompass expenses associated with raising the country’s capacity in all of these categories.

The following table presents cost estimates for the acquisition and implementation of the technical components of the proposed NCC. Cost estimates for tasks such as topographical mapping have not been presented because further analysis is needed to properly prepare the specifications for those tasks.

Estimated NCC System Costs

Amounts are in USD thousand.

Item	MLME	Forestry	Agriculture	Oil & Gas	NBC	Lands Commission	Selected Regional Offices (5)	TOTAL
Hardware and software (NCC, document mgmt.)	50	750	750	750	350	350	500	3,500
Training (2 system managers and 2 technicians each institution)	75	75	75	75	75	75	175	625
Data entry—technical management oversight	–	–	–	–	250	–	–	250
Data entry—clerical support (2 per MAC, plus 2 supervisors at NBC)	25	25	25	13	50	25	–	163
Office facilities (a/c, partitions, generators, etc.)	50	50	50	50	50	50	250	550
Project management tech assistant	–	–	–	–	400	–	–	400
BAA tech assistant to modify current internal processes and procedures	150	150	150	150	–	150	–	750
On-site international technical assistance for 2 years	–	–	–	–	600	–	–	600
Contingency								500
Subtotal System Costs								<u>7,338</u>

Estimates of Additional Cost Items

The following are very general estimates which are more useful for determining orders of magnitude of costs rather than for precise budgeting. All prices are in US dollars:

Re-survey all land-based concession boundaries:	1,000,000
Budget shortfall for control surveys by USAID LPIS Project:	100,000
Demarcate all Customary Lands (including adjudication):	4,000,000
Demarcate all Protected Lands:	1,000,000
Public Awareness Campaign regarding the surveys of Customary Lands:	1,000,000
Community-based dispute resolution:	750,000
Acquire ortho-rectified, high-resolution, satellite imagery of Liberia:	250,000
Optional large-scale LiDAR-derived topographic mapping:	6,000,000
Support funding for the Presidential Concessions Task Force (CTF):	300,000
NCC annual recurring S/W maintenance:	100,000
NCC annual recurring consumables:	25,000
Establish teaching capacity in academia for surveying:	750,000
International training for 12 GIS technicians:	750,000
Annual maintenance of the Continuously Operating Reference Station (CORS):	5,000
Subtotal Additional Cost Items:	16,030,000
Estimated System Costs (from the previous table)	7,338,000
Total Estimated System Costs (without contingency for additional items)	<u>23,368,000</u>

ANNEX 1. OVERVIEW OF SPATIAL DIMENSION

Spatial Dimension appears to be the world's leading company offering an off-the-shelf GIS-based system to manage and facilitate the complex business of administering natural resources concessions and related agreements. According to the firm's web site (www.spatialdimension.com), the FlexiCadastre system has been implemented in over 90 jurisdictions worldwide. In fact, Spatial Dimension recently announced that two of their clients, Zambia and Kenya, have published their mining cadastre data online to drive operational efficiencies, improve stakeholder communications, reduce opportunities for corruption and improve transparency within their respective mining sectors.

FlexiCadastre is a web-based, enterprise-scale GIS software product built on standard IT technologies. FlexiCadastre is specifically designed to serve the needs of concessions managers, and while mining concessions have been the system's focus, the technology is also an effective



tool for forestry, agriculture and oil and gas concessions. FlexiCadastre is suitable for managing legal agreements and financial obligations regardless of the type of concession. These obligations typically include all submissions, applications, payments, approvals, public participations, deadlines, financial reports, work programs, communications,

notifications, approvals and escalations and any other workflow related items associated with the rights to explore and/or exploit natural resources.¹¹

It is important to recognize the ability of FlexiCadastre to integrate with other GIS systems in Liberia. FlexiCadastre is based on Esri's general-purpose ArcGIS software that has all basic and much advanced GIS functionality. ArcGIS provides a customizable interface for all levels of users from data entry staff to advanced GIS professionals. Most importantly, the ArcGIS spatial data model is generally considered the most widely-used (Tennant 2011). Use of an Esri-based GIS spatial data model will facilitate integration with other GIS applications in Liberia, and will encourage the sharing of digital GIS files between concessionaires, the NBC and other government agencies. As mentioned in the text, USAID's LPIS project is currently implementing an ArcGIS-based system to digitize and manage property deeds at the Liberian National Archives. These property ownership records deal with surface rights in land that must eventually mesh with data in the NCC. Similarly, USAID's PROSPER project is exploring the use of ArcGIS technology to support community forestry development, and the resulting GIS data will clearly need to integrate with those of the NCC. As such, it is important to maintain a common GIS technology foundation and spatial data model across all of the granting authorities.

¹¹ The map showing the location of FlexiCadastre installations is from Spatial Dimension.

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ANNEX 3. REFERENCE MATERIALS USED IN THE CONCESSIONS CADASTRE ROADMAP CONSULTANCY

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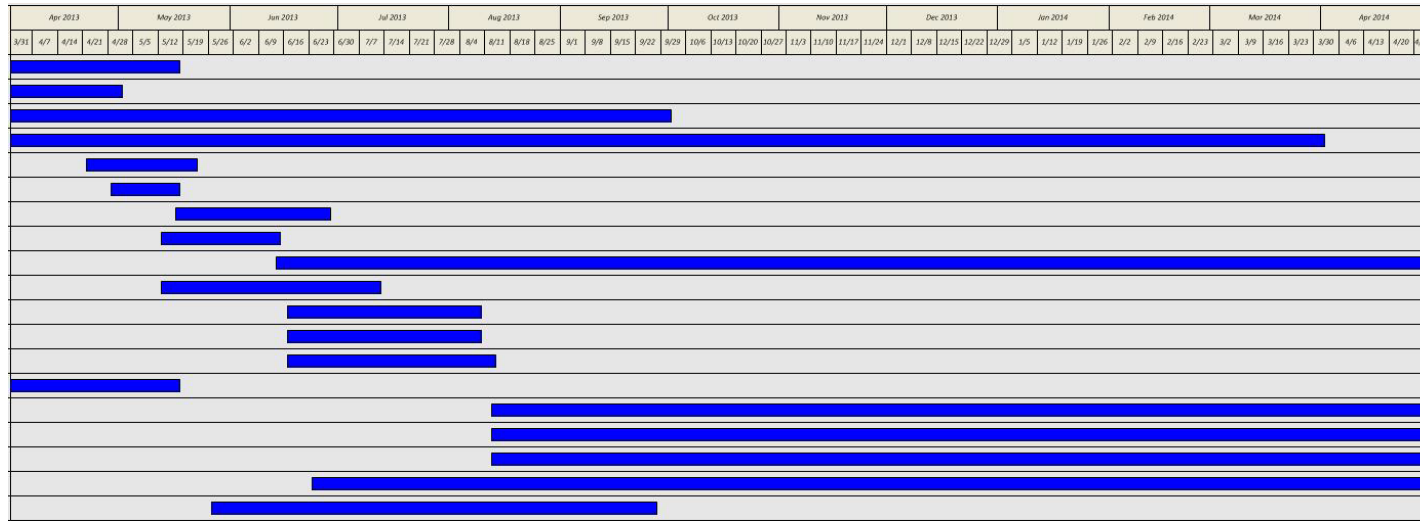
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ANNEX 4. NCC CRITICAL TASKS¹²

<i>ID</i>	<i>Task Name</i>	<i>Start</i>	<i>Finish</i>	<i>Duration</i>
1	Task 1: Pay Annual S/W Maintenance to Spatial Dimension for MCIMS	4/1/2013	5/17/2013	7w
2	Task 2: Sign NCC inter-agency cooperating agreements	4/1/2013	5/1/2013	4.6w
3	Task 3: Institute Presidential Task Force on Concessions	4/1/2013	10/1/2013	26.4w
4	Task 4: Review the institutional, policy, and legal framework of concessions	4/1/2013	4/1/2013	52.4w
5	Task 5: Prepare TOR for Business Area Analysis of each stakeholder	4/22/2013	5/22/2013	4.6w
6	Task 6: Convene BAA review committee	4/29/2013	5/17/2013	3w
7	Task 7: BAA Bidding process	5/17/2013	6/28/2013	6.2w
8	Task 8: Prepare justification for MCIMS roll-out	5/13/2013	6/14/2013	5w
9	Task 9: MCIMS implementation (roll-out)	6/14/2013	7/11/2013	56.2w
10	Task 10: Create NCC implementation team	5/13/2013	7/12/2013	9w
11	Task 11: NCC staffing plan	6/17/2013	8/9/2013	8w
12	Task 12: Prepare NCC infrastructure plan	6/17/2013	8/9/2013	8w
13	Task 13: Engage international survey firm for survey standards and regulations	6/17/2013	8/13/2013	8.4w
14	Task 14: Complete the national geodetic control network (USAID LPIS project)	3/11/2013	5/17/2013	10w
15	Task 15: Resurvey all concession boundaries	8/13/2013	8/12/2013	52.2w
16	Task 16: Demarcate Customary Lands	8/13/2013	8/13/2013	104.6w
17	Task 17: Demarcate Protected Lands	8/13/2013	8/13/2013	52.4w
18	Task 18: Public awareness campaign in rural communities	6/24/2013	8/13/2013	111.8w
19	Task 19: Acquire satellite imagery	5/27/2013	9/27/2013	18w

¹² Note: This list is roughly based on, but does not follow exactly, the lists of technical and institutional tasks found in prior sections of this report.

APPROXIMATE TIMELINE FOR NCC CRITICAL TASKS



ID	Task Name	Start	Finish	Duration
1	Task 1: Pay Annual S/W Maintenance to Spatial Dimension for MCIMS	4/1/2013	5/17/2013	7w
2	Task 2: Sign NCC inter-agency cooperating agreements	4/1/2013	5/1/2013	4.6w
3	Task 3: Institute Presidential CTF on Concessions	4/1/2013	10/1/2013	26.4w
4	Task 4: Review the institutional, policy, and legal framework of concessions	4/1/2013	4/1/2013	52.4w
5	Task 5: Prepare TOR for Business Area Analysis of each stakeholder	4/22/2013	5/22/2013	4.6w
6	Task 6: Convene BAA review committee	4/29/2013	5/17/2013	3w
7	Task 7: BAA Bidding process	5/17/2013	6/28/2013	6.2w
8	Task 8: Prepare justification for MCIMS roll-out	5/13/2013	6/14/2013	5w
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11	Task 11: NCC staffing plan	6/17/2013	8/9/2013	8w
12	Task 12: Prepare NCC infrastructure plan	6/17/2013	8/9/2013	8w
13	Task 13: Engage international survey firm for survey standards and regulations	6/17/2013	8/13/2013	8.4w
14	Task 14: Complete the national geodetic control network (USAID LPIIS project)	3/11/2013	5/17/2013	10w
15	Task 15: Resurvey all concession boundaries	8/13/2013	8/12/2013	52.2w
16	Task 16: Demarcate Customary Lands	8/13/2013	8/13/2013	104.6w
17	Task 17: Demarcate Protected Lands	8/13/2013	8/13/2013	52.4w
18	Task 18: Public awareness campaign in rural communities	6/24/2013	8/13/2013	111.8w
19	Task 19: Acquire satellite imagery	5/27/2013	9/27/2013	18w

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